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# The International Journal of Orthodontia and Oral Surgery

*A Monthly Journal Devoted to the Advancement of the Sciences of Orthodontia, Oral Surgery, and Dental and Oral Radiography*

Martin Dewey, D.D.S., M.D., Chicago
Editor-in-Chief

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# International Journal of Orthodontia and Oral Surgery

**A Monthly Journal Devoted to the Science of Orthodontia, Including Surgical Orthodontia, Oral Surgery, and Dental and Oral Radiography.**



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The International Journal of
Orthodontia and Oral Surgery



VOL. VI ST. LOUIS, JANUARY, 1920 NO. 1

## *ORIGINAL ARTICLES*

### POSSIBILITIES AND USE OF REMOVABLE LABIO-LINGUAL SPRING APPLIANCES*

BY GEORGE B. CROZAT, D.D.S., NEW ORLEANS, LA.

REGULATING appliances are mechanical devices for exerting force upon malposed teeth for the purpose of creating cell activity, and thereby causing the teeth to assume a proper position in the line of occlusion. Appliances are divided into two classes, fixed and removable. It is through the work of V. H. Jackson that removable appliances have been developed to their present usefulness. It may be said that it is possible to treat any type of malocclusion with removable appliances, although a number of varieties of malocclusions can be more successfully and more easily treated with this form.

Jackson, in his textbook on *Orthodontia,* states that it is possible to construct removable appliances with both base and noble metals and especially recommends the use of nickel silver and gold clasp in their construction.

I shall endeavor to show the possibilities of removable appliances constructed with clasp gold and iridio-platinum. These appliances will permit adjustments similar to the lingual arch appliances attached to molar bands either soldered or by a locking device. It is also possible to use the high labial wire with finger spring extensions found so useful in depressing protruding anterior teeth. By the combination of the labial and lingual springs, it is possible to rotate teeth in torsiversion and to move teeth both mesially and distally in the line of occlusion.

The attachment piece or cribbing device is sufficiently stable to resist the force exerted on the malposed teeth and admits of removal when necessary.

The appliances being constructed with noble metals are durable and easily repaired when broken. Changes and additions as the work progresses can be made by the free hand method.

*Read before the Alumni Society of the Dewey School of Orthodontia, St. Louis, Mo., March 6-8, 1919.

Among the advantages of removable appliances is that the teeth and appliances can be brushed thoroughly, and that they exert a mild, constant, painless pressure so essential in correcting malocclusions.

Fig. 1 illustrates a case of bilaterally distal relation of the lower arch, with protruding upper anterior teeth before and after treatment.

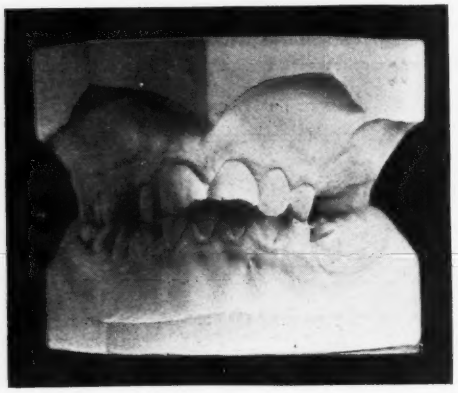
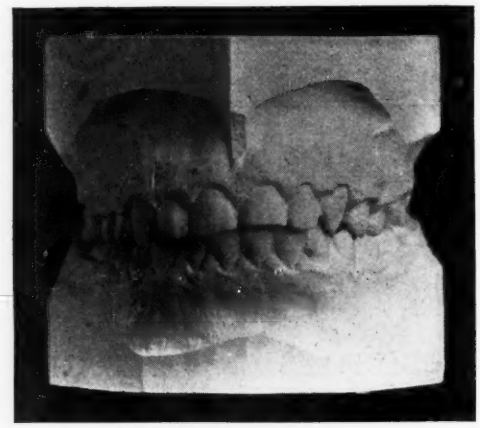


Fig. 1-*A*.



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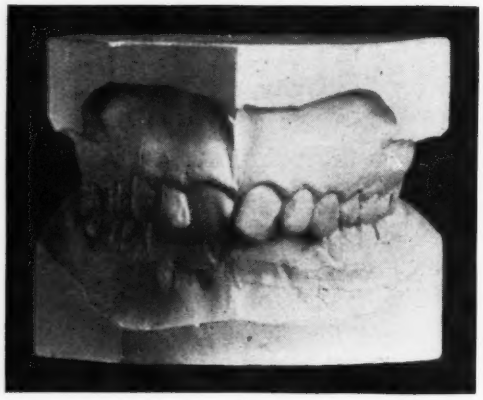

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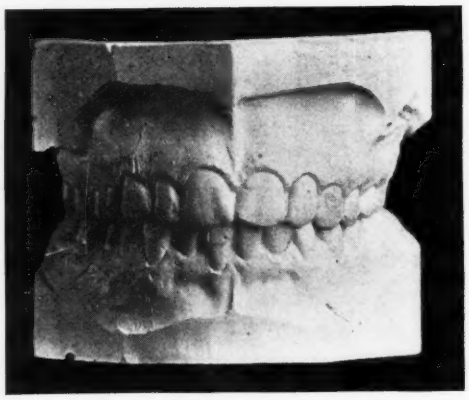

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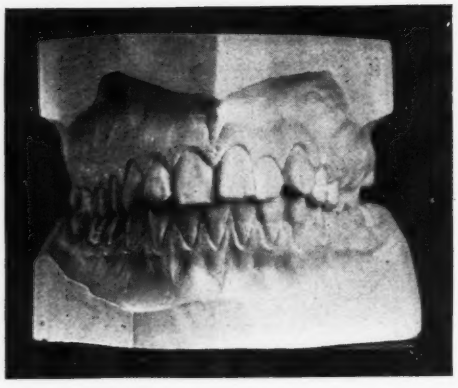

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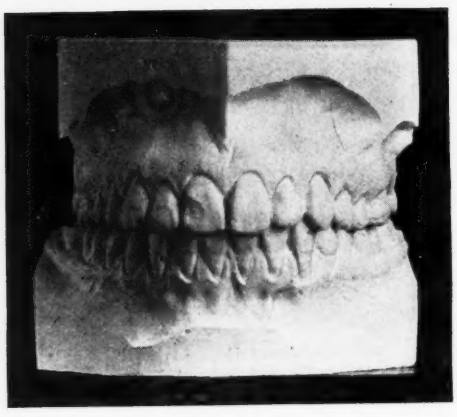


Fig. 3-*B*.

Fig. 2 shows a case of unilaterally distal relation with retruding and bunched anterior teeth.

Fig. 3 illustrates a similar case with the exception that the upper molars on the left side are in lingual version to the lowers.

Fig. 4 illustrates a case of bilaterally distal relation of the lower arch in

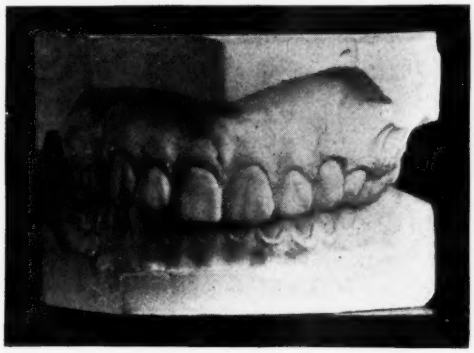


Fig. 4-*A*.

Fig. 4-*B*.

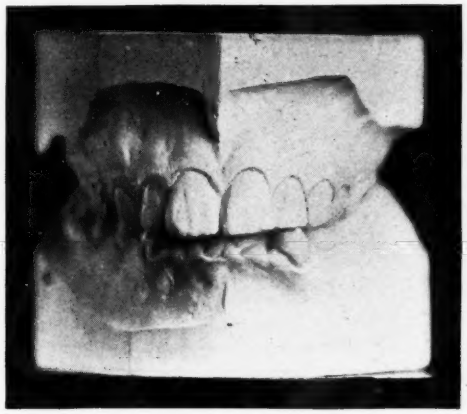
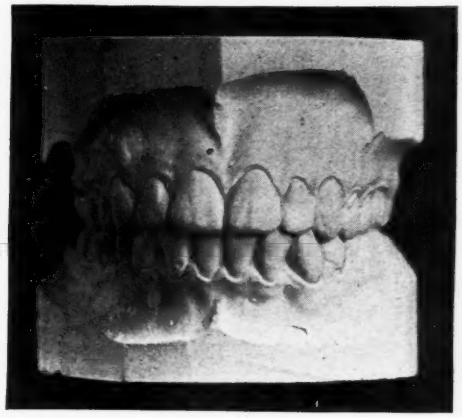


Fig. 5-*A*.



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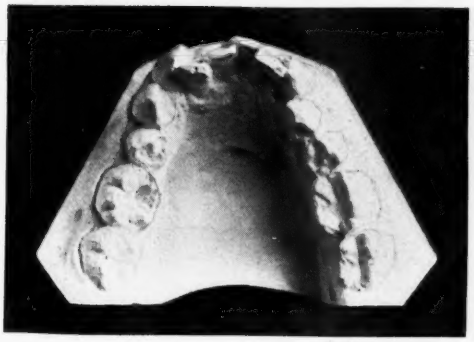

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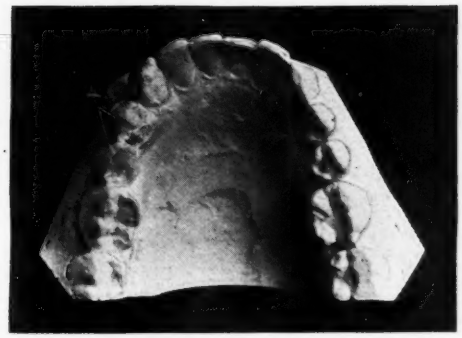

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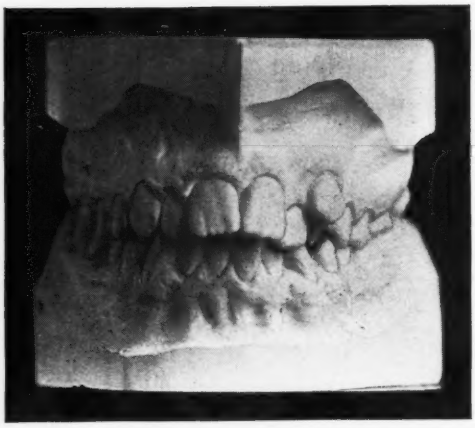


Fig. 7-*A*.

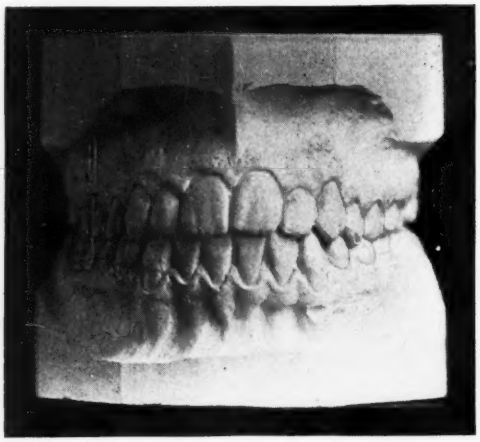


Fig. 7-*B*.

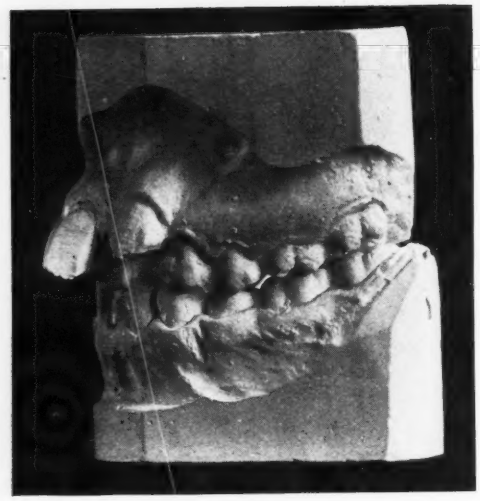


Fig. 8-*A*.

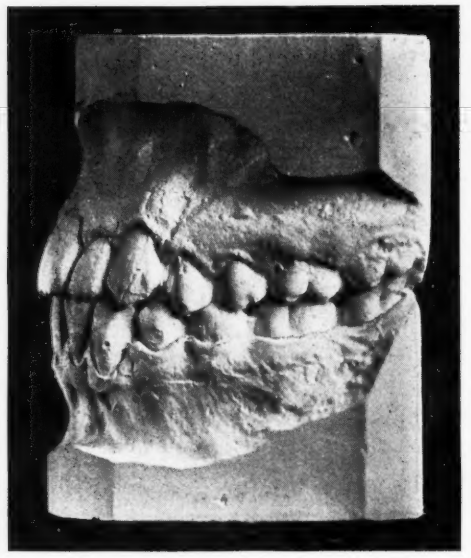


Fig. 8-*B*.

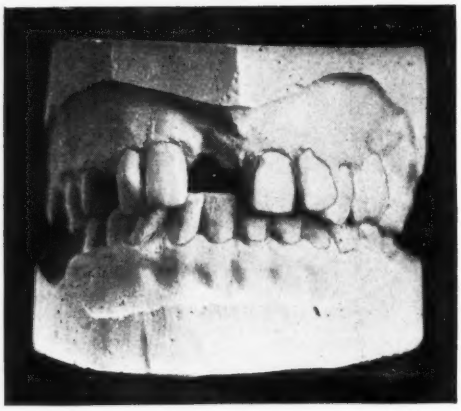


Fig 9.

which the protruding anterior upper teeth had been depressed without establishing a normal mesio-distal relation of the arches.

Fig. 5 is a case of neutroclusion with labioversion of the upper incisors.

Fig. 6 is the same case, occlusal view, showing expansion accomplished.

Fig. 7 illustrates a case of neutroclusion with bunched anterior teeth or a complex neutroclusion.

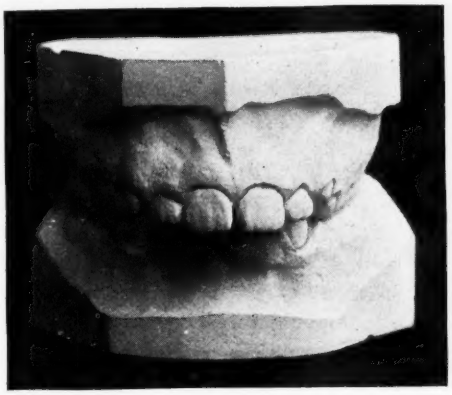
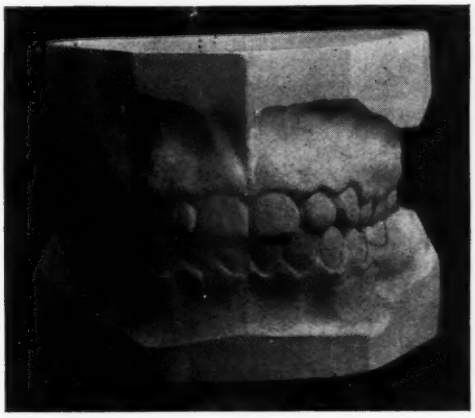


Fig. 10-*A*.



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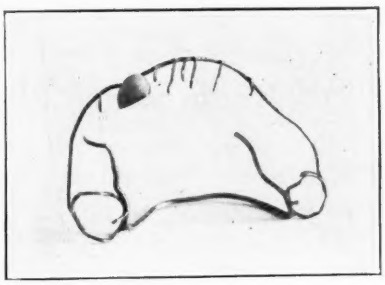


Fig. 11.

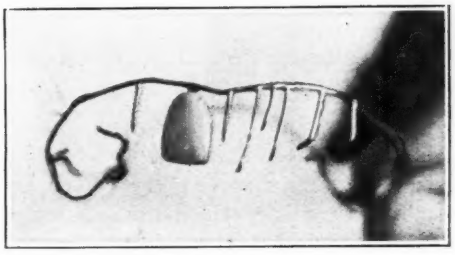


Fig. 12.

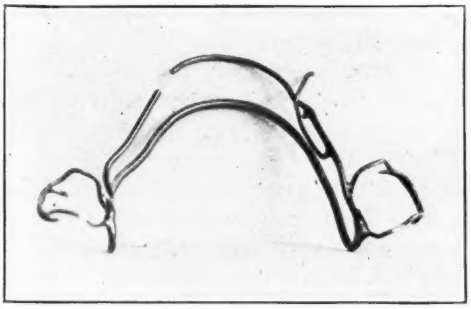


Fig. 13.

Fig. 8 shows lateral views of the same case as in Fig. 7.

Fig. 9 is a case necessitating regulation for bridge-work with excessive space for the restoration of an incisor.

Fig. 10 shows a case of bilateral distoclusion before and after treatment.

Fig. 11 is an occlusal view of the appliance used in the treatment of Fig. 9 in which the high labial wire carried an incisor.

Fig. 12, same appliance from the labial aspect.

Fig. 13, an example showing construction of a lower appliance.

DISCUSSION

*Dr. W. F. Taylor, Fond du Lac, Wisconsin,* was asked to open the discussion. He said: "As I have not used this appliance, I do not feel competent to discuss the paper. However, I wish to compliment Dr. Crozat on the beautiful results he has obtained with this appliance."

*Dr. H. A. Pullen, Buffalo, New York.*—I have examined a few of these appliances, and it seems to me they possess a good many features of an appliance with which many of you are familiar. For instance, let us take the appliance of Dr. Lourie which he has shown us, with a heavy labial arch with a fixed anchorage. This heavy labial arch is attached to finger springs somewhat after the manner Dr. Crozat has used. Dr. Lourie's appliance has a more fixed anchorage, but if you will recall the picture Dr. Crozat showed, the anchorage was made as nearly stable as possible with the removable appliance. There are no bands upon the teeth. The little spring he had next to the molars went over the occlusal surface, another one going around anteriorly, and I imagine that occasionally some other springs are used to help to hold the appliance in position. It relates itself as nearly as possible to a fixed appliance, giving to it as nearly as possible a fixed anchorage, with the exception of banding the teeth.

In my experience the nearer we come to the fixation principle in the attachment of an appliance, the more efficient that appliance will be.

If I had any criticism to offer, in regard to this appliance, it might be along those lines.

Dr. Crozat is using precious metals and he understands perfectly that a base metal appliance does not come up to their standard for appliances.

In some men's practices a removable appliance will work to advantage and in others it will not. I made the statement sometime ago, and I shall repeat it now, that removable appliances have in a sense become fixed, partly and mainly through the idea of making them as stable as possible, which tends to make them fixed. At the same time, you well know that in the evolution of orthodontia fixed appliances in a sense become removable, so that we have a peculiar state of affairs existing—a fixed appliance becomes removable, and a removable appliance becomes fixed. However, as I said before, the nearer we come to the fixation principle in the use of any of these appliances, the more efficient they will be, because if you have a fixed apparatus in the mouth you are quite sure that the appliance will not be taken out at meal times, laid on the table, brushed into the tray, or go into the waste-basket. A patient turning somersaults in the hay will not lose the appliance, neither will he take it out and put it in his pocket when he wants to eat candy. On the other hand, if the patient should eat molasses taffy, it would destroy an appliance of that kind and you would have considerable trouble in reconstructing it. All these points appeal to one who has had experience with that type of appliance. I have used them, and I have not given them up altogether. There are cases where they are very valuable and have some advantage; but so far as their universal use is concerned, they do not appeal to me as much as the appliances which have a more fixed anchorage.

The analysis of appliances along these lines I want to discuss in my paper, and describe the method of their analysis. I will attempt to analyze this appliance from the standpoint of the principles of anchorage. The first thing that appeals to me is the manner in which Dr. Crozat attaches his anchorage in the molar region, using that as a basal anchorage, and the next point is in analyzing the appliance from the standpoint of fixation which relates to any appliance. The basal wire itself is often part of the primary or basal anchorage, because it is made so heavy that it does not change in shape, and simply acts as a base of anchorage attachment for the spring arms.

The next point in relation to this analysis is the anchorage at the points of delivery of the forces which I have designated as secondary anchorage, which I shall attempt to describe in the use of my own appliances in my paper.

Aside from the technical discussion of the paper, I wish to compliment Dr. Crozat on his splendid presentation which I have enjoyed very much. From what I have said, I would not attempt to discourage him in the use of appliances of this kind.

*Dr. Crozat (closing discussion).*—In closing the discussion, I will take up some of the points brought out by Dr. Pullen. The fact evident is that all appliances are coming to the point of either being fixed with the removable idea or removable with some fixation principle. As example, consider Dr. Jackson's appliances which are referred to as a fixed removable type. Collars with the inclined planes upon the buccal aspect of the teeth are used to increase stability. Through the use of multiple attachments, the appliance is fixed because its anchorage is made secure. There is no form of fixed or removable appliance which has more secure anchorage than this form.

Consider the appliances used by Dr. Mershon, in which case they are fixed by the use of locking devices to molar bands. The advantages of this form are a mild spring force, simplicity, inconspicuousness, and that they can be removed for adjustment. Again a fixed removable variety, but not removable from the standpoint of the patient.

Another for consideration is that form used by Dr. Lourie, the high labial wire with finger spring extensions used in conjunction with the lingual arch. The patient can remove the labial portion of the appliance and place it upon a form of modelling composition. This is done to reduce the possibility of bending when out of the mouth; another fixed removable feature. In this instance, the ends of the high labial arch are anchored into horizontal buccal tubes on molar bands.

Removable appliances constructed with noble metals are not universal, neither do I think there is any appliance which is ideal and universal in the treatment of all forms of malocclusion. I have endeavored to use several forms of appliances and do not confine myself to the use of removable ones constructed with noble metals. I use this form where I think it can be used efficiently, accomplishing the result in less time and with less inconvenience to the patient.

An appliance to approach the ideal must be sufficiently durable as to last through the treatment or until such a time as the operator deems it necessary to change.

In using finger springs and lapping springs on the lingual surfaces of incisors, they must be of sufficient gauge so that they will not become distorted.

Regarding the question of losing appliances, if patients are inclined to remove their appliances for little or no reason, and probably lose them while turning somersaults in the hay or otherwise, I say that removable appliances are not intended for the treatment of those individuals. Few, if any, of the fixed varieties would resist such patients. For this reason the patient must be made to realize the consequences, and several punitive measures may be used to prevent such occurrences. Parents, guardians, and the children are generally very careful that the appliances are not lost.

# PROPHYLAXIS IN ORTHODONTIA*

By J. Frank Nelson, D.D.S., Chicago, Ill.

In presenting a paper on the subject of Prophylaxis in Orthodontia, no attempt has been made to bring out anything new or novel. I simply desire to call your attention to a few problems and conditions we meet in practice, and offer some suggestions for their solution.

Much has been written and taught in recent years disclosing considerable diversity of opinion, and conviction on the subject of prophylaxis. Many courses on instruction are offered to the student of the specialty, varying widely in theory and technic. A vast amount of material, equipment and instruments are to be had for the use of the operator. Consequently it has been truly said that there is prevalent a hazy conception of just what oral prophylaxis is, what it is supposed to do, where it begins and ends, what is the proper technic, and what constitutes a so-called prophylactic treatment. An analysis of the word "prophylaxis" answers all these questions except that related to technic. The word "prophylaxis" means, literally, "to guard before." Oral prophylaxis then means the performance of any operation, manipulation, interference, or procedure, designed to guard the teeth and adjacent tissues of the mouth *before* or *against* disease or abnormality. In other words, it is the purpose of oral prophylaxis to maintain a normal physiologic condition and to prevent the pathologic.

To be exacting the term "Prophylactic Treatment" seems to be a discord or misnomer for the reason that the word "Treatment" has long been associated with, and implies, disease, while prophylaxis is out of harmony with disease, and ends where treatment is indicated.

It could not be called an act of prevention or "guarding before" if one were to lock the garage after the car was stolen. The question of method or technic used in the practice of oral prophylaxis becomes largely one of personal preference on the part of the operator and the requirements of the case in hand. Like all other technical procedure the method or the instrument which would seem best and most effective in the hand of one operator, would not necessarily be so in the hand of another and it matters little, so the results are attained and oral health is maintained.

In some cases especially those of young patients prophylactic care may be started at once without preliminary treatment, but in most instances it is necessary to do a certain amount of preparatory work before instituting prophylaxis. This preliminary treatment consists of extractions where there are fragments of roots remaining, it consists of removal of all deposits, it consists of fillings in deciduous or permanent teeth, it consists of grinding and polishing all enamel defects, sharp angles of teeth, fillings or other restorations, it consists of the restoration of contact points and normal occlusion by fillings or orthodontic treatment, it consists of the treatment and restoration of normal

*Read before the Alumni Society of the Dewey School of Orthodontia, St. Louis, March 3, 4, and 5, 1919.

septal and peridental conditions. After the mouth has been placed in as nearly normal condition as possible by treatment, the patient should be instructed as to the daily care of his mouth and then placed on the list for prophylaxis. He should be required to present himself at regular intervals, the frequency of these visits depending on the individual case and the success of their daily care. Some individuals may go for five or six months and keep their mouths in very good condition, while others should have attention after that many weeks.

The usual procedure when a patient is given prophylaxis is very short, about half an hour. If it takes longer than that, they are probably waiting too long, and that is one of the best ways of arriving at the proper length of time between visits.

If there are any deposits, which there should not be if they come often enough, they, of course, must first be removed. This can be done with the minimum of disturbance to the soft tissue by scalers designed to be used with the draw or planing motion. All stains are disclosed by painting a few teeth at a time with disclosing solution, immediately rubbing and polishing with wood points, dipped in some harmless abrasive,—flour of pumice, silax, prepared chalk or some of the dentifrices. The spray should be used frequently during this operation, with some mild pleasant solution. Intermaximal spaces and under bridges, etc., can best be reached and polished by the use of tape or wide floss with a little abrasive carried with it. The surface under the free margin of the gum labially and lingually can be polished by the use of rubber cups, preferably the very small conical ones about the size of the business end of your porte polisher. They spread out nicely over the tooth and root and are very thin at the edge. The grooves and fissures on the occlusal surface of the molars and premolars can be cleaned and polished most effectively with stiff brushes, and those are the only surfaces of the teeth on which brushes can be used with safety. Much damage can be done to the soft tissues by the careless use of brushes in the engine.

There are cases where orthodontic treatment may properly be termed an oral prophylactic measure, especially when by interference with abnormal tendency during the developmental period the teeth may be guided into their proper place in the arch and occlusion, and normal proximal contact, and normal occlusion, produced.

An objection is sometimes offered against orthodontic treatment, arguing that it produces caries and gingivitis. No doubt there may have been cases where this criticism was justified, but it would be difficult to determine the truth of the accusation for the reason that from six to sixteen or eighteen years of age is the period in life when carious teeth are most prevalent whether they are receiving orthodontic treatment or not, and gingivitis may come from other causes, usually neglect of the proper use of the brush and floss. However, every precaution should be taken against injury to the teeth and membranes, both in the construction and manipulation of orthodontic appliances.

It would be folly to treat a case of malocclusion by the use of an appliance of material, which, by reason of its construction, composition, or operation, would so injure the teeth or supporting structures as to impair their functional value, or increase their susceptibility to disease, and thus defeat the object of the treatment.

First then we are concerned with the construction of our appliances. From the prophylactic standpoints they must be so constructed as to give the least possible interference with function or damage to the tissues and permit the greatest possible freedom in the care of the mouth.

Preliminary to orthodontic treatment the teeth should be carefully scaled and polished; a very stubborn case of gingivitis may be produced by a particle of calculus forced down against the membrane by a well made band. As few teeth should be banded as is consistent with the requirements of the case, using deciduous where possible. All bands should be carefully fitted, contoured and festooned so they do not impinge on the membranes. They should also be burnished nicely into the bucco-linguo and proximo-occusal grooves to prevent slipping rootwise, in case cement should fail, and to avoid injury to lips and tongue. The ends of all spurs, springs and tubes should be nicely rounded and polished, arches and alignment wires should be kept away from the gum margin where possible, and either placed against the teeth or high and away from the gum margin.

The best appliance, for prophylactic reasons, is the high arch with finger springs. It gives the least disturbance of function, does not impinge on the gingival tissue, and permits the free use of brush and floss. Ligatures should be used with care to prevent slipping rootwise and injuring the membrane. If possible a reverse loop should be thrown around the tooth occlusally to prevent this. Certain materials are best suited for orthodontic purposes, for prophylactic reasons on account of their antiseptic properties. Some of their base metals or compounds containing copper possess this property. They may be less valuable, however, as to their physical properties than platinum which has no antiseptic value. This phase of the subject, however, is of much less importance if proper prophylactic care is exercised preparatory to and during orthodontic treatment. Some operators use the copper cement in preference to other cements on account of its supposed antiseptic properties.

The functions of the teeth should be interfered with as little as possible if we are to carry these cases through with a minimum of peridental trouble. This would argue against the use of jackscrews and other positive appliances that fix the teeth and prevent functional movement. Prophylaxis in or during orthodontic treatment is of special value for the reason that it requires the construction of appliance of the highest efficiency, the minimum complexity, the greatest comfort, and least injury to the patient. The frequency of visits for orthodontic treatment gives opportunity for prophylactic care that should not be had otherwise, during the impressionable age of the individual, when the best habits of the care of the mouth may be formed, and an appreciation of their value realized, that will remain with them during life.

It will be necessary to do more than remind you that early orthodontic treatment together with the radiogram becomes a valuable measure in the prevention of certain malocclusions. Traumatic occlusion is no doubt the cause of more peridental diseases than all other factors combined, and though much traumatic occlusion is the result of poorly constructed restorations, the large percentage is caused by malposed teeth with abnormal inclined plane relations. Abnormal

proximal contact is not only a cause of gingival and peridental troubles, but contributes to the cause of caries as well.

It seems fitting also at this time to remind you of the importance of orthodontic treatment in general prophylaxis. Malocclusion through its effect on mastication becomes a causative factor in nearly all the disorders of the alimentary canal, plays a very important part in the cause of some of the diseases of the respiratory tract, and disturbs the functions of speech, to say nothing of its effect on facial development and deformity. Volumes might be written on any one of these subjects and I will not do more than call your attention to them and suggest that you read and study and think of these things.

Orthodontia is something more than the science of the movement of the malposed teeth; it is a subject of inestimable value not only in oral but general prophylaxis as well.

DISCUSSION

*Dr. H. B. Hamilton, Ithaca, New York.*—I do not know that I can say very much in connection with this paper because I am so fully in accord with everything that Dr. Nelson has said. I found soon after taking up orthodontia that prophylaxis was a very important part of our work, and I found in my work that it was perhaps of equal importance with the orthodontic treatment.

The one thing I was very glad to hear Dr. Nelson speak of was the use of brushes. That is something I have never used; I could never feel that I could use them without doing severe injury, and yet I find they are used quite generally. I had a supply man tell me within the last week that he had sold sixty dollars' worth of brushes to one of our prominent orthodontists.

The doctor mentioned the use of some base metal materials for banding on account of their antiseptic properties. I use these very largely, but I find there is one disadvantage in their use, and that is, on the teeth whose structure is a little below normal, there is a possibility of staining, and I never feel safe in leaving a band of any kind on for any great length of time. I have no doubt that in some cases where I get staining from the base metal materials I would get decay with other metals. The use of appliances which do not hold the teeth very rigidly is a splendid point and should be emphasized much more than the doctor has done.

The time between treatments I find varies very much. I have some patients for whom I never have to do prophylactic work; others need prophylactic treatment at every appointment. To me the use of a hygienist has been of the greatest importance. I have had one from the time they were legalized, and at the present time I do not feel I could get along without one. In fact, I feel so strongly in favor of it that I am having a member of my own family take the course at the present time, not with the idea of her doing the work, but to be prepared in case my present hygienist should leave me, by having some one to take her place temporarily.

I do not know that I can add anything further to the paper because the doctor has left so little for me to discuss.

*Dr. A. C. Gifford, Oshkosh, Wis.*—Dr. Hamilton spoke about giving prophylactic treatment each time the patient came. It would appear to me that removing the appliances, as would certainly be necessary for thorough prophylactic treatment, would tend to injure the gums more than perhaps some of the accumulations that had not been brushed off by the patient himself.

*Dr. S. W. Bradley, Ottawa, Canada.*—There is one point which Dr. Nelson brought out which I think was very good, and that was the contour of the bands put on the teeth that are being moved. In Dr. Angle's book he advocates a straight band because if you contour it, you will weaken it. I think is is bad practice not to contour the band in the interproximal space and escape the gingival tissues.

I use brushes once in a while, but I do not use the large ones. The small cup brushes I have are fairly soft, and you can clean stains from the teeth far better with them than with small rubber cups. The rubber cups should be used after the brushes to actually polish the teeth. The rubber cup I like best for prophylaxis is a small cup that spreads well out over the tooth and gets under the gingival margin. It makes a splendid cup to polish after using the brush and removing the rough debris. I like a powder best that does not fly all over and leaves a beautifully smooth surface.

You will notice when the permament cuspids erupt, they are often very rough. Nasmyth's membrane on them seems to be tenacious, and if you are not careful with your alignment wire, and have it up close to the gingivàe you will have decay in a very short time. In two cases I have had decalcification. The enamel was white and chalky. I took a small fine Arkansas stone in the engine and ground that decalcified enamel right out and polished it, and I do not think there will be any further decay in that area.

*Dr. J. A. McPhail, Blandchester, Ohio.*—I believe this is the first time I have ever heard a paper on prophylaxis read by an orthodontist, and I congratulate the society on having Dr. Nelson read this paper, because he has specialized in this work for several years, and as we all know, he is a man of ability, and has given us this paper in a way that everybody can understand it.

I believe our first duty, when we take a case, is to clean up the mouth. There is no excuse for any practitioner working in a filthy mouth, and the first thing to do is to clean it up; take out the old roots and what is necessary and do it at the start.

The second thing is to teach the patient how to care for his mouth. There is not much use on your part of doing all the work and the patient doing little or nothing. We get these patients at a time in life usually when we are bound to make an impression on them, and we can never tell with a little patient just what things will impress him the most.

I remember a few years ago of working for a lady who was seventy years of age, and I congratulated her on her beautiful set of teeth, and she told me that when she was a child her parents lived in Paris, and they had a friend who was a portrait painter. He was taken sick and she accompanied her mother to the hospital, and they brought flowers to the artist, and the artist asked her to come over and sit opposite him as he was in bed. He asked her if she knew what two things were necessary for a beautiful picture, and she was unable to tell him. He said to her, you could not have a beautiful picture without beautiful eyes and beautiful teeth.

Now, what is the use of spending probably a year or more in trying to give a patient a beautiful set of teeth if that patient does not take care of the teeth after spending years of work and much money. I think we can start with the children. You can not have a child for a year without making some impression on him. Children will like you or hate you, so that ultimately you will have to get a divorce.

I think all orthodontic work is really prophylactic work, and all orthodontic appliances should take into consideration prophylaxis.

I think it is very fortunate for orthodontists that in the National Dental Association we have a Section on Orthodontia and Periodontia where we can be drawn together. Naturally we are going to receive a great deal of criticism from these periodontists, and unfortunately we are deserving of some of it. I think they will stimulate us to take a greater interest in prophylaxis. We ought to do it anyway, but they will keep at us until we have to do it. I believe all treatment of malocclusions will improve a patient's health, but what is the use of trying to correct one condition and bring on another, such as pyorrhea, because of ill-fitting bands and many cumbersome appliances that were made years ago. I think oftentimes it is the case of jumping out of the frying pan into the fire; you get rid of the malocclusion but you have developed a nice case of pyorrhea. I prefer having a slight case of malocclusion to having a case of pyorrhea. It is unfortunate sometimes that when we take cases of children that caries will develop very rapidly and we get the blame. So I think we ought to start in first with prophylaxis and keep everlastingly at it as long as we have the case.

*Dr. Nelson (closing).*—One of the gentlemen spoke of an oral hygienist. For my own part, I prefer to do the work myself. That may be a personal reason, but I have

a feeling that I can get better results. I feel that I could not get a girl or a nurse I would trust to do this work. It is too important to trust to others.

Something was said about the inconvenience of doing prophylactic work with an appliance on. A good time to think of that is while you are making the appliance. Sometimes a minor change without interfering with the function of the appliance will aid you greatly in your prophylactic work. I rarely ever take off bands in doing prophylactic work. I take advantage of a band or bands being off to do prophylactic work occasionally, but ligatures or removable parts, wires, etc., can be removed easily. Take off everything you can, but so far as that is concerned I do not believe it interferes with or is an excuse for not keeping the mouth in good prophylactic condition.

Grinding the enamel is a good thing to do if you use good judgment. Although I spoke of enamel grinding, it was for the purpose of arresting enamel defects and preparing the mouth for prophylactic treatment.

I believe that is all I have to say.

# HISTORY OF ORTHODONTIA

(*Continued from page 674, Vol. V.*)

By Bernhard Wolf Weinberger, D.D.S., New York City

J. H. MAGRUDER in the September *Dental Cosmos* 1889 introduced *A New Regulating Device.*—"The appliance consists of a strip of gold plate, 26 gauge, three-sixteenths of an inch wide and about two and a half inches long. At intervals corresponding to the width of the upper oral teeth holes the size of a No. 3 bur are drilled through the strip, and at each end, opposite each other, two smaller holes are to be made. Two pieces of gold wire, say 20 gauge, are then soldered to the strip near its end and so placed that the wires will overlay the holes and the free ends nearly meet in the middle of the strip, as at *A* in the illustration (Fig. 1). It will be observed that each wire is soldered only at one of its ends. Suitable rubber bands are then slipped over the wire, a piece of floss silk passed through each band, the ends of the silk put together and pushed through the holes and appear as shown at *B*. The number of bands will of course depend on the number of teeth to be moved. The appliance as illustrated may be adopted to the drawing or pushing of irregular oral teeth into line, but it is preferable to form the strip upon a cast of the case so the holes may be drilled at points corresponding to the anchorage teeth and to the positions into which the other teeth are to be brought. Ligatures through the end-holes will serve to secure the plate to the biscuspids or other anchorage teeth. The bands should be as thick as may be to act in separating as well as drawing the teeth. By suitably

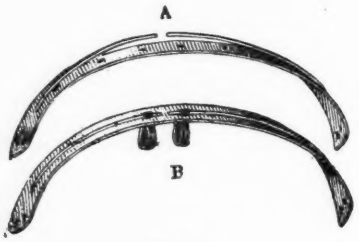



Fig. 1.

bending the plate it may be made to bear on the tooth or teeth which are to be moved inward, and thus the plate will both push and pull in effecting the regulation.

"For holding the teeth until firmly set in their new positions, I employ a gold wire very carefully fitted and tied to each tooth with sterilized silk ligatures.

"The appliance described is simple, effective, and occupies the least possible space between the teeth and the lips, which are not liable to be chafed by the plate because the bands or ligatures lie very close upon the plate over the wires, as is made obvious by the illustration."

*W. G. A. Bonwill's "Method of Correcting Irregularities of the Teeth"* has already been described, but we find in *The International Dental Journal* for 1889

further studies and new appliances along these lines. Bonwill says he discarded his previous methods, they being:

"My first essay on orthodontia was written in 1862. To make my own history more replete, however, it is necessary to show what I have done in this line of work since 1854. As the apparatus was then entirely new and the practice considered rather radical for the time, and as it has since been revived by others, I shall briefly present them here.

"From the following language it will be seen that the 'Coffin plate' of rubber was anticipated by me, except that I used silver wire made spiral, and adjustable or detachable from the plate previous to 1862.

"If the inferior jaw, I clasp, where possible, and when not, strike up a plate to cover the deciduous or permanent teeth, as they may be, and operate from this. From the inward inclination of the inferior bicuspids and molars (or molars alone of the temporary set) there will be sufficient firmness gained by making it to press outward at these points.

"If there are no other means of holding it in the inferior jaw, an india-rubber plate made to fit accurately either the teeth or palate, or both; and if you desire, the surface of the vulcanized plate can be roughened to enable the patient to masticate thereon, and screw the spiral springs into this.

"This I seldom use, being bulky and dirty, and far more liable to injure the faces of the teeth. More can be done with the spiral spring soldered to a metal plate.

"The same principles of action I still adhere to; namely,

"1st. To commence as soon as possible after the seventh year, or as soon as there is evidence of decided irregularity.

"2d. To watch all children's teeth from the third year and determine by an exploring needle, every three months, the exact position of the coming permanent teeth as soon as the first permanent molar has appeared.

"3d. To preserve, by early treatment, the first and second molars—temporary—even to the treatment of their pulps, if the little patients are not brought in time to obviate it.

"4th. To be sure the first permanent molars are preserved without loss of pulp, and to allow nothing to interfere with their full and free development in the arches, as upon these teeth more than upon any others are due the irregularity, from coming too forward in the arch, from decay of approximal surfaces of temporary molars, or from the tardy eruption of the permanent incisors. The six-year molar drives the arch into smaller space when the incisors have appeared out of or inside the arch.

"5th. That all apparatus should be simple and, if possible, firmly fixed, so that the patient can have no control over it; and then see the case every few days.

"6th. That constant and uninterrupted pressure is preferable. The antagonism of the opposite jaw will always be exerting a force to make them move back and forth in the sockets, and this makes sufficient intermittent pressure.

"7th. That while one plan, without some change in each case, will not do, yet the infinite number of apparatus is a greater nuisance to patient and operator.

"8th. That the impressions of both jaws in plaster and a duplicate from the first; so that the plaster teeth can be cut off and rearranged to see the effect, and

these models placed in the anatomical articulator, where they can be studied in the lateral movements, so necessary. That this shall be studied carefully; and, before action is taken, have the patient call and study the case in relation with the plaster model; and if doubt exists as to the extraction of a tooth or teeth, better postpone a few days and send for patient again rather than make so great a blunder.

"9th. That a tooth shall be held as sacred as an eye; and, while extraction is sometimes demanded, when the greater good of the patient is at stake—when of weak constitution—yet do not too hastily resort to it.

"10th. That without the combined assistance of parent and child better not commence.

"11th. That nothing shall be withheld from the child or parent, but every detail, every risk, and the amount of patient endurance needed, the long time, and, when all is corrected, to allow of stay plates, that the work gained may be retained.

"12th. Not least of all the factors, you must place such valuation on your services as will insure your interest and will drive the parties concerned up to their duties.

"To these points I would now further insist on the great importance of utilizing as factors or fulcrums the temporary molars.

"1st. By shaping them with a disk on all their sides or surfaces, so that a gold clasp can be securely placed thereon.

"2d. Where only a ligature is needed, to cut a groove with the disk on the buccal and palatal and lingual surfaces near the cervix, in which to place the silk ligature to keep it from working down under the gum.

"These teeth will soon be lost, and no injury is done by shaping and grooving them.

"3d. By the use of gutta-percha, warmed and placed on the palatal or lingual side of the tooth, around which a ligature is to be placed and carried slightly up over the grinding surface to prevent the ligature from pressing down under the gum. This I use on permanent teeth.

"4th. Where the tooth can not be cut or gutta-percha used, then gum sandarach varnish or a thin solution of oxyphosphate zinc placed on the tooth will prevent the ligature from slipping when the tooth is being rotated, or to keep it from pressing up under the gum.

"5th. The immense importance of the anatomical articulator, with the geometrical and mechanical laws governing it.

"The study of this alone will lead to the anticipation of so many irregularities, and will teach one to begin very early. It shows how invariable is law; and, when violated, where the cause is and how to obviate it.

"It shows what is an archetype, and demonstrates clearly how the highest efficiency is reached in the equilateral triangular jaw of man, and that nothing can be made more perfect either by nature or by man."

The appliances used by *Bonwill* in 1889 are described in the following manner:

Fig. 2 represents a curved bar made of platinized gold with four holes punched for the passage of silk ligatures. It is another way of applying Fig. 3, without band, and is used mostly for a single tooth in either jaw.

"Fig. 3 is this same bar with a clasp on one side of the arch. The bar is lengthened beyond the clasp to allow of the rubber tubing, tied at *B*, being attached far enough away from *A* in order to give sufficient power to move the teeth desired.

"It was applied, Fig. 4, by clasping a first molar where the right central had to be twisted, and the lateral also, but in opposite directions. The bar rests upon the mesial buccal edge of the lateral while the silk ligature is carried twice around the central, bringing it up next the lateral, and is now drawn through the rubber band which has been tied opposite the molar. The rubber is stretched to the full length of the bar. The cuspid was also drawn outward on the same bar by boring a hole directly opposite, which was made to twist the cuspid as well as to draw it outward.

Fig. 2.


Fig. 3.

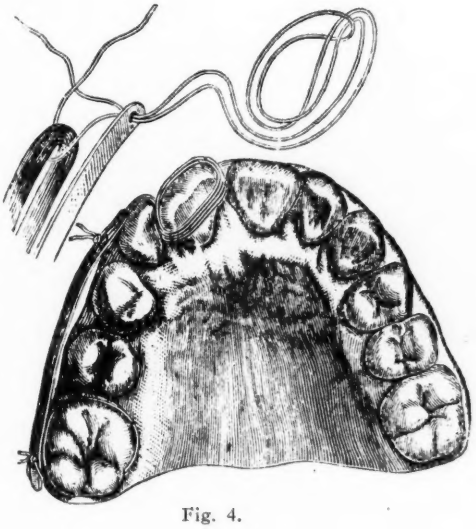


Fig. 4.

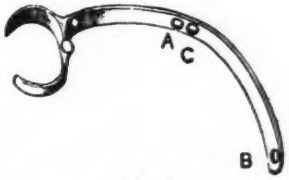



Fig. 5.

Fig. 6.

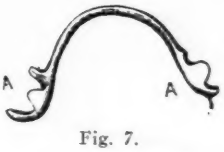



Fig. 7.

"Fig. 5 is the same bar applied for drawing out both superior laterals and expanding the arch.

"The gutta-percha stay-plate (see Fig. 6) is for keeping the ligature off the gum at the cervix, on the first molar. A piece of pink base-plate gutta-percha was warmed and pressed up against the molar, letting it rest partially on the adjoining teeth; when cold, two holes were made in it for the passage of the ligature, which was tied on the buccal surface of the molar. A rubber band was tied to the inside before adjusting. A ligature was then cast around the right lateral, carried up between it and the cuspid, and over it through the space where the first bicuspid was extracted, on the lingual side of the first bicuspid, and tied to the rubber band attached to the gutta-percha stay or helmet on the first molar, and stretched over the buccal surface of the cuspid. This drew the lateral out very forcibly. The arch was first expanded by the fixture shown in Fig. 7, made of piano wire, with half clasps of platinized gold at *AA*, made with small ears to

rest on the grinding surfaces of the first bicuspids to prevent slipping down upon the gums. These clasps were soft soldered to retain the full temper of the piano wire as a spring. It is a very cheap and easy way of making such an apparatus and with a powerful spring which such cases demand.

"Fig. 8 is another modification of Fig. 5, the single bar, and is applied in Fig. 7, where the four superior incisors are to be moved forward from one-fourth to three-eighths of an inch and the whole arch expanded to meet the more perfect and larger arch in the lower. It is made of two flat bars of platinized gold sliding over each other for at least two inches. A loop is soldered to the end of each flat bar as guides to hold them in place while sliding through. A rubber band is shown attached to the end of each bar at *AA,* which, in contracting, enlarges the circle, and consequently not only throws out the incisors, but the bicuspids and cuspids as well.

"The attachments are made on either side to a molar or a bicuspid, owing to the ease of clasping. I have utilized the decay on the anterior surface of a molar by filling with amalgam, and cutting a hole for one end of the bar to rest in instead of using a clasp.

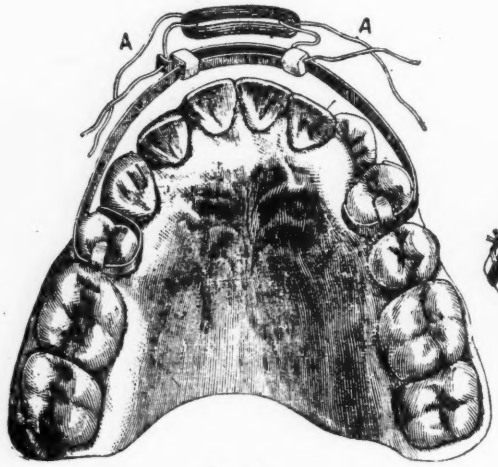



Fig. 8.

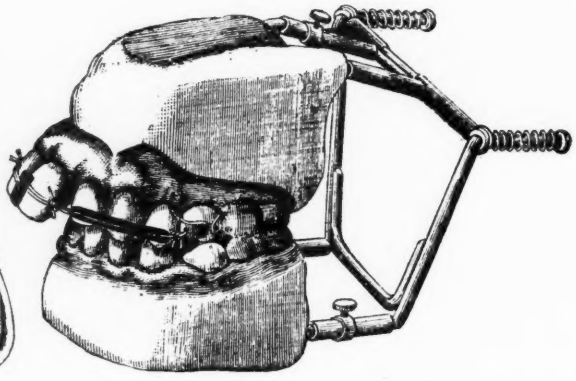


Fig. 9.

"Before the apparatus is placed permanently in position, the incisors are ligated with a loop, using gum sandarach varnish to prevent slipping or turning on the tooth. The ligature should be so adjusted as to twist the tooth, if needed, while drawing it forward. These are then tied to the sliding bars, bringing them closely in contact with all the teeth in the arch. The rubber band is then tied between the two points, and the application is complete. It is easy to see not only its simplicity, but also its great effectiveness. It can be used equally well for contracting an arch.

"Fig. 9 shows the worst case of protrusion of the upper jaw I have ever seen. It did not arise from an acquired habit, nor did it have any precedence in heredity. The temporary teeth had proper arches. No cause could be assigned. They came as you see in Fig. 9. The lower incisors, when I first saw the case, were three-eighths of an inch from the superior incisors on their palatal surface, and were imbedded in the gums on the hard palate.

"Before attempting to draw in the incisors I made a rubber plate (Fig. 10) to cover the hard palate, thickened where the lower teeth would touch, and opened the jaws at the bicuspids at least one-eighth of an inch. This was not only to drive the inferior incisors up into their sockets, but also to allow the bicuspids and molars to come down and antagonize before the plate was removed. Two years were consumed in this. To this plate was then attached a rubber band carried entirely around the arch with a silk ligature, and a metal hook, with two holes, was carried over the cutting edge of the central incisors, through which the ligature passed. This kept the ligature down on the incisors near the cutting edges, and while it was aiding in drawing in the arches, it did another important thing: forced the centrals up into the alveolus. This was done by the tendency of the rubber band to work up towards the gums, and at the same time it pressed them up and made them shorter without grinding. This was a case parallel with the one delineated by *Dr. Kingsley* in *Oral Deformities,* but without any of the treatment given there. A gold band, running over the arch from the second bicuspids, which was soldered to clasps around the latter, and which could be adjusted or removed by the patient, was used to secure it in position.

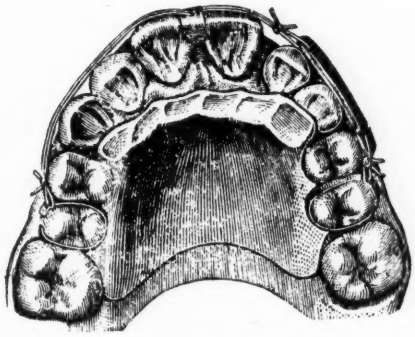


Fig. 10.

"The explanations of geometrical law, and the value of the anatomical articulator in showing how the first permanent molar plays so important a part in making the lower incisors roll over one another, and thus make the smaller arch with a very deep under and overbite where seen. I am almost quite ready to say never extract the first permanent molar. Keep down the inferior incisors. Have the first permanent molar take its place soon and rapidly in the arch. Drive it backward toward the ramus rather than have it move forward to make the underbite too deep."

"To a person of any comprehension these are simple devices and plain rules; the application can be made to any case of irregularity. Any one can surely make the apparatus. Whoever hereafter shall undertake this branch of practice should first read my article on the geometrical law of articulation and study the principles involved, and not attempt wildly to do what but few men have ever truly fathomed. Really, in every city, some one should make of this a special practice, and the profession should encourage such by sending cases for inspection and consultation. And such a specialist should do all he can in return to teach by example and demonstrations by clinics, to enlighten those who are placed so far from large cities that they are compelled to take such cases. When we can have

that understanding between us, then we may feel as banded brothers more fully equipped for these hitherto difficult and almost thankless operations."

In the *American System of Dentistry* 1887, vol. ii, page 486, *Dr. Bonwill* contributed a chapter on *The Geometrical and Mechanical Laws of the Articulation of the Human Teeth.—The Anatomical Articulator.*

"After more than thirty years of active life in dentistry I am fully persuaded that all that constitutes dentistry proper the mechanical forms the basis. And yet to make anything that is beautiful in our art, especially in vying with nature in matching the teeth, we must be more than mere mechanics, more than capable of filling a tooth or treating an abscess; we must be dental artists. When we introduce a set of teeth upon which depends so largely the expression of the face from the soul beneath, we must bring to our aid not only the laws of mechanics and geometry, but the beauties of art. It is not enough that we accurately adapt the plate to the gums; that we so grind the teeth to the plate as to be water-tight; that we so make every joint that it can not be distinguished; that we so polish the plate over symmetrical curves that the tongue can not find the least fault. We must do something besides this: we must impart *action* to these otherwise whited sepulchres; we must instill life therein or our labor will be in vain. A tooth may be elegantly shaped and colored, yet if it lacks the proper shape for the person for whom it is intended and is unskilfully set in the arch, it is a failure. The blocks from the same mould set by different operators may vary in effect in every case. For this the operator should have a number of blocks of the various shapes, colors, and sizes, and try them under the lips until his judgment tells him which to use. The dentist's taste can be so cultivated that he will be apt to criticise his own selections.

"I shall use the term 'articulation,' instead of 'occlusion,' for the very good reason that it is more in keeping with the functions or the motions of the jaw. If there was but one movement of the lower jaw, and that up and down, we might possibly say occlusion. But this latter term applies more properly to the shutting of the lips or closing the mouth, and not to the motion of the lower jaw dependent on the articulation of the same at the glenoid cavity, where the articulation is universal. Articulation is a word of action throughout, while occlusion answers to the mere act of closing the teeth and lips and keeping them closed; one is active, the other passive. Before we can comprehend, then, what constitutes true articulation of artificial teeth, we must look at the anatomy of the human jaw and its functions.

"We find from twenty-eight to thirty-two teeth in each jaw, arranged in such manner that no two strike directly against each other, but antagonizing in such a manner as to prevent the whole denture from becoming very irregular, which would be the case if striking one against another. By this arrangement, when one tooth is lost the regularity of the arch is interfered with. As necessary as this is in nature, it is not positively necessary to follow it in artificial work, although for the sake of harmony it should be done.

"It will be found in 95 per cent of cases that the upper teeth project over the lower, and that the depth of overbite varies as the depth of the cusps of the bicuspids are deep and shallow; the ramus will be found to come upward and backward in relative proportion to the length of the cusps and the overbite.

"One point of very great importance has not been given in general or special anatomy: *The peculiar tripod arrangement of the lower jaw, forming an equilateral triangle.*

"From the center of one condyloid process to the other four inches is about the average; and it will be found that from this same center of the condyloid process to the median line at the point where the inferior centrals touch at the cutting edge is also four inches. It is strange that it should have been overlooked; but it only shows when studied in a geometrical and mechanical sense, the great wisdom in our formation. It varies, but never more than one-half of an inch, which would make no difference in describing an arc of a circle. No matter what the width from the processes, the distance is the same to the median line of the lower jaw. Were the lines of the angle five feet, the teeth made in the anatomical artic-

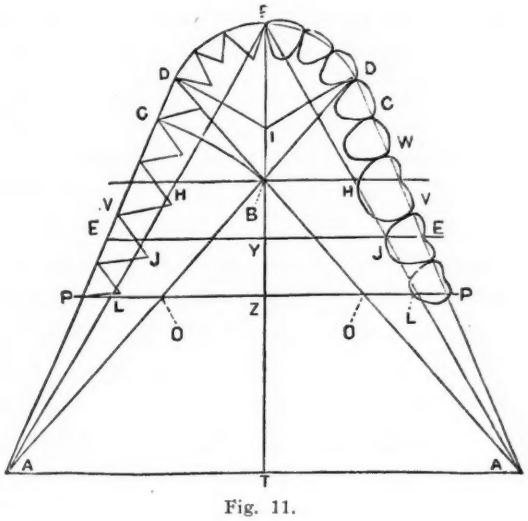



Fig. 11.

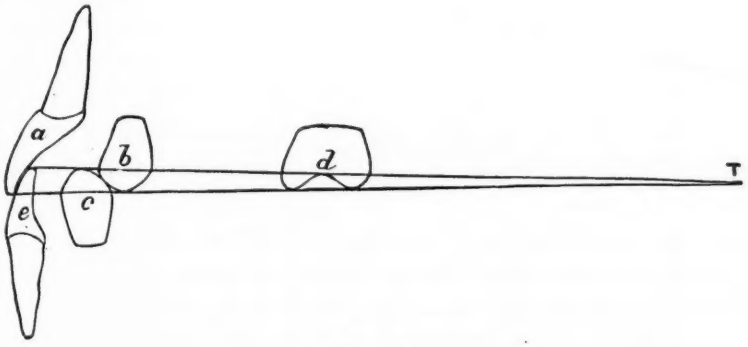



Fig. 12.

ulator would fit the case. It will be perceived that in setting artificial teeth, one-fourth of an inch, the radius of the circle, would not materially alter the articulation. Without such an arrangement the teeth would have to be flat on their grinding surfaces to admit of lateral movement. Besides, there would not be the beautiful and wise curvature at the ramus for equalizing the force applied to the teeth in all directions.

"Imagine the human jaw jointed in a line with the pharynx, or as is seen in the ordinary brass articulators. Can it be supposed that there would be greater wisdom displayed in such hinging or articulating a part destined to such varying motions and powerful wrenching force? No! The study of this one part of the head and jaws shows one of the most striking designs of an architect; and when studied it will be seen that every part of our frame is made by a positive law and to subserve definite purposes, such a law being in consonance with geometry, physics, and mechanics. We must see the true use or function of the jaw and the teeth and the food destined for us, and how it should be comminuted; there is no chance work about it! Law and order pervade every part. The jaw forms a perfect triangle, for the purpose of bringing into contact the largest amount of grinding surface of the bicuspids and molars, and at the same time to have the incisors on one side at once come into action during these lateral movements.

"It will also be found that from the cuspids, the bicuspids and molars run in nearly a straight line, instead of a curved one, back toward the condyloid process, enabling them to keep the largest amount of surface always presented for mastication. Another thing which has never been explained by anatomists or naturalists is the law of the normal relation of the upper to the lower incisors. The normal jaw should overjet, and also have a corresponding underbite. Without such a law the incisors would lose largely their functions, that of incising on the principle of a pair of scissors. Where the incisors strike directly upon each other the power to cut off food would be very much lessened. The length of cusps on the bicuspids and molars proves the law.

"Another unobserved fact: where law is supreme, where there is an overbite and underbite just in proportion to their depth will be the length of the cusps of the cuspids, bicuspids, and molars.

"By drawing two lines from *T* to *F*, Fig. 11, or *T* to *A* and *E*, Fig. 12, we have the lengths of the cusps of the bicuspids, *B*, in the upper and *C* in the lower, and also *D*, the second upper molar. The depth of the underbite is one-eighth of an inch from the cutting edge of the inferior central incisor *E* to that of the superior central incisor *A*. Did the teeth extend as far back as *AA*, there would be flat surfaces at those points. But in articulating artificial teeth, when the superior second molar is reached its distal cusp has to be raised from line *TE* to *TA* (Fig. 12), to allow the molar teeth on the opposite side, not in mastication, to touch, for merely balancing the plate, otherwise the second molars would be of no use in lateral movement, nor would the first molars. This curvature at the ramus commences at the first molar, although it shows itself slightly in the bicuspids. Practically, it need commence at the first upper molar. This curve, then, will always be proportioned by the underbite at *A, E*. The length of the cusps and bicuspids will never be more than an eighth of an inch, normally; the groove deeper than that would cut the palatal cusp off, and make of it a cuspid. It would in reality be cut in twain. *This is another unobserved fact. It always has been and will be found in the archtype of human jaws.*

"So that when a first superior bicuspid is seen it can very well be told from the length of the cusps whether the jaw from which it came had a depth of underbite of one-sixteenth of an inch or more. Where the teeth all strike fairly

one upon the other, without overbite, then there is no occasion for cusps. If originally there, they would soon be worn off from the abnormal articulation.

"This provision of articulation is most wise, carrying out still more fully the exact law by which the anatomical movements of the lower jaw for perfect mastication are governed. So beautiful and mathematical a design can not but call forth our admiration and wonder, and the study of no other part of the human body will give one a clearer idea of infinite wisdom. This movement, we will find in the artificial sets arranged upon this law, will prevent the plates from tilting. In the natural denture the incisors are really the first teeth to be arranged, though the first molars emerge first to assist in the more perfect mastication of food and to keep the jaws at the proper distance. The incisors show a definite fixedness of purpose to arrange themselves after their typal shape, and to form the overjet and overbite at a given depth for the accommodation of the bicuspids and molars, which are soon to appear, having cusps of a definite length, so that the law of articulation which has been premeditated to a certain typal shape and construction be carried out.

"It will also be found that the grinding surfaces of the bicuspids and molars have a typal shape, allowing them to meet with all their surfaces touching, for an express purpose, after a preordained and established law, from which the greatest area is gained for mastication, and that the inner cusps of the lower teeth are as necessary as the outer of the superior when laterally moved. The law is still farther carried out in the curvature at the ramus from the second bicuspid to the third molar, to permit of all the surfaces on one side to be in contact, while the other unused side is only partially so. The nearly straight line of arrangement from the cuspids to the last molar is also in keeping with the underbite (Fig. 12). It may well be asked, just where, "Will the law hold good in an artificial articulator such as I use, applied to the setting of artificial teeth?" As soon as the attempt to apply this principle is once made, the operator must certainly grasp this law, so wise and beautiful. There may be variations, but the general law will hold good, and where there has been much latitude or varying from it by abnormal mixtures of races or types, if Nature is given fair chance to right herself she will return to the normal standard of mathematical and mechanical precision: to do otherwise would annihilate creation. *Cells free to arrange themselves must develop the original creation, and perpetuate and keep it to the perfect standard, by selecting the highest type of perfection in shape, strength, beauty, etc.*

"Could the reader but stand beside me while I arrange a set of teeth in this articulator, he would of necessity become converted to my system as founded on law and not on chance. There is no other part of the human body that will permit of thus handling and unfolding, and again rearranging—no other that stands outside its own organic workings that will permit such demonstration. It is the key to the revelation of Nature's inner workings, and unfolds, without a *missing link*, what we were, absolutely perfect in cell and organism from the inception, and simply in conformity to an indefinite and all-wise law which can not be blotted out. The teeth individually, have been a great factor in science; and when they can be looked at from the point of view therein laid down and hitherto undeveloped, their significance will be magnified; and if we, as dentists,

but take up the work as only belonging to our specialty, and scientifically prosecute it, our honors and standing will be enhanced.

"This triangle can only be found within a perfect circle in which there are the greatest breadth and area of surface. No other geometrical angle would have given such perfect beauty and symmetry to the face. The compactness brings the largest number of teeth nearest the center of motion. The double joint permits the greatest strength and the easiest lateral movement, with the greatest range of this at the least expense of power and compass. It permits the largest number of teeth to antagonize at every movement; *and, not least of all, this very triangle is the means by which Nature develops the typal shape of the ramus and of the formation of the jaws, the underbite, etc.*

"This form of triangle is necessary, again, for the purpose of giving the largest number of muscles a chance to act on both sides simultaneously and concentratedly, thereby keeping the circle or arch of grinders down to their work and equalizing the pressure on all sides. It enables the teeth on the side where the chewing is being done to arrange themselves when erupting so that they will be very nearly in a line with the left condyle, which is now passive on this side, and forms one point of the dividers in forming the arc of a circle; and by this condyle being where it is—four inches from the other—the molars and bicuspids, as well as the central at that side, all come in the most perfect contact for chewing and incising, thereby carrying out this absolute law of Nature of the perfect adaptation of geometry and mechanics to her uses, and having no lost motion or function in any part.

"Again, the triangle gives an extra motion forward which brings the lower teeth in contact with the upper to incise or cut off food presented there. The type has been preordained, just as has the nose or the peculiar shape of the eye or any other part of the body. If in the arrangement of the teeth in the human jaw no type or design were laid down in conception or embryonic life, what malformed creatures we should be mentally and physically! *And it will be found that just in proportion as there is congenital insanity or want of will or directing power, there will be a malformation in the arrangement of the teeth, while in shape they are perfect.*

"*The Equilateral Triangles within the Main Triangle.*—The outline drawings in Fig. 11 may be thought *ideal.* But any one at all acquainted with geometry, who has followed me in my argument and description, must be struck with wonder at the marvellous ingenuity of the contrivance based alone on the equilateral triangle. It will be seen that perfection must be the result, since each part is complete within itself and the whole supporting each individual part.

"How have I arrived at this divination? The law is based on the measurement of over two thousand human skulls. First, make an equilateral triangle 4 inches each angle, $A$,[7] $A$,[6] $F$; draw a line from $T$ to $F$. What is the guide to form the arch? Know the actual width of the superior central, lateral, and cuspid at their greatest diameter from mesial to distal surfaces—say $^{13}/_{16}$, as in Fig. 11. Measure this off with the dividers, and place one arm at $F$, and describe an arc from $D$ to $D$ through $I$. Then place dividers at $I$, and intersect the line just made from $F$, and it will be found that at $D$ will be the extremest point of the arch $D$, $F$, $D$, and will be the distal surface of the superior cuspid.

Place the dividers at *I*, and describe the arc from *D* to *D* through *F*, which will constitute the normal and positive arch of the superior jaw. There will be an equilateral triangle from *D*, *F*, *I* on either side of the mesial line at *F*. The same will be found the base of each superior incisor.

"Next draw a line from *A* to *D* on either side, which will be the guide for the bicuspids and molars as to width and depth. Then by placing the dividers at *A* and *B*, describe another arc to *C*, which will give the width of first superior bicuspid. The line from *A* to *D* passes through its palatal base, and will pass through centre of base of triangle of this tooth.

"Form another triangle by drawing a line from *H* to *H*, through *B*, which will pass through the center of the first molar, and will give the width between their palatal surfaces or their depth or thickness. Placing the dividers at *I* and *F*, we intersect the line from *F* to *T* at *Y*. Draw a line through *Y* to *E*, forming another equilateral triangle. From *B* to *F* is now the radius of another arc, which intersects the line from *D* to *A* at *V*, and the line *A* to *D* at *O*. A line now drawn from *E* to *E* through *Y* intersects the center of the second molar at *E*, *E*. Get half the distance between the points at *E* on the line from *D* to *A*, and the width of the first molar is made, and also the second, which is the angle of the equilateral of each. This leaves room between the first bicuspid and first molar, and is the width of the second bicuspid: or it is shown by placing the dividers at *A* and *Y*, and intersecting line from *D* to *A* at *W*, same as from *B* to *C*, for the first bicuspid's width. The distance from *D* to *D* is the same as from *D* to the distal surface of the second molar. *P* to *P* through *Z* forms another equilateral triangle, giving the wisdom tooth's place in the arch.

"The arrangement on the left shows the teeth in the act of mastication, while on the right the inner cusp of molars of the upper and outer of the lower molars come in contact when not in use. There is double the surface touching at every lateral movement.

"In conclusion, let me again impress all with the importance of cultivating mechanical art in our calling; for I can assure the reader that it will pay tenfold in increasing his usefulness as an operator in every department, and in giving him powers of conception, and lead the way to original ideas and more practical development."

Before the *World's Dental Congress*, 1893, *Bonwill* continued this investigation under the title of *What Has Dentistry to Demonstrate against the Hypothesis of Organic Evolution*, and made the following thirteen claims:

"Claim 1. That the human jaw and teeth show, beyond doubt, the workings of absolute laws which gave them the highest efficiency and from which organization there could be no change except retrogressive, not progressive; not to a higher form.

"Claim 2. The human jaw is based for its organization and workings upon the principles of the equilateral triangle, which, as well, underlie the shape of every tooth and the numbers to occupy that equilateral space.

"Claim 3. Given the length of one arm of this triangle, say four (4) inches, and it can be shown from this alone how, whatever or whoever made the first human jaw, that with a pair of dividers and a straight edge the size, shape, and number of each tooth in both upper and lower jaws and their absolute places

therein were made; and further what should be the exact arch containing the six incisors in both jaws and the action in mastication and incising of food.

"Claim 4. That the human jaw is no exception to this rule. That the proportions of the human body were founded on the equilateral triangle and unless so, no fitter organization could have ever existed or been brought into being nor could it ever have been reached unless by the same rule at the very beginning of its existence.

"Claim 5. That if the hexagon cell of the bee, which cell existed before man, is incapable of change to make it fitter for the object for which it was designed, then we can claim it as a precedent that the same principle in the human jaw is none the less true and demonstrable.

"Claim 6. I claim not only to have discovered the laws by which organizations are made, but have perfected the drawings from these laws by which any skilled artisan or mechanic can reproduce and duplicate, artificially, what the working model here presented demonstrates and its action shows beyond doubt the highest efficiency in such an arrangement, based simply on the principle of the equilateral triangle.

"Claim 7. If the human mind can not conceive of a fitter organization than what is here demonstrated, and produce it from the laws and principles of evolution, then there can be no progression to a higher state that can form a basis of argument for the evolutionist.

"Claim 8. That as no one can show any fraud in this work and the claim of "an ultimatum having been reached" by a human being, it must follow that Nature, who had the first chance at the building of organizations, must have done her best and made the fittest in the beginning.

"Claim 9. It is claimed that natural selection could only have reproduced a preexisting organ or organism or previous type and could add no new organ or alter the form of the preexisting one to higher efficiency.

"Claim 10. That mechanical means, which can only be externally applied, can not even reproduce an existing type, let alone form an additional organ or organism.

"Claim 11. There is no proof that when any organ has once been lost that it has ever been reproduced in the same animal; in the progeny, the same organ will again appear, but nature will patch up in order to prolong life, but never in one life time make the effort to ever reproduce the lost organ, or lay the foundation in the offspring to make an additional organ either like the original or make one of a higher efficiency.

"Claim 12. The human jaw (to the glory of dentistry) furnishes one of the strongest or most absolute proofs of Claim 10 in the reproduction of the temporary set of teeth, which when completely lost at the age of fifteen, again appear in the offspring when there was no such organism existing at the time of procreation to give birth to an entirely new temporary set in that offspring.

"Claim 13. The dental apparatus affords the best proof of the workings of a practical scientific workman from preexisting laws, and nothing but intelligence and a personality could have ever conceived and made such organs and organisms, and no further proof is needed of the purely scientific productions given in this discovery.

*M. Siegfried* in the *Deutsche Monatsschrift für Zahnheilkunde,* 1889, page 184, explains his *Methods of Correcting Irregularities of the Teeth* by the use of the *Coiled Springs.* Figs. 13 to 18 illustrate this principle. Again in the *Dental Cosmos,* 1896, page 497, *Siegfried's* appliances are described by *R. Runschenbach.*

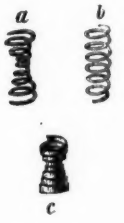



Fig. 13.

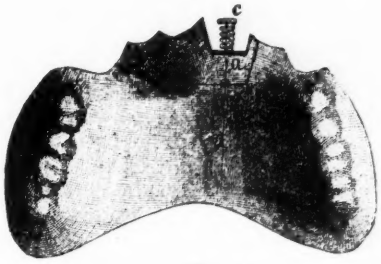



Fig. 14.

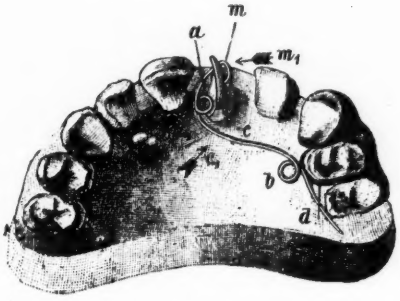



Fig. 15.

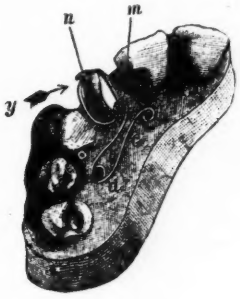



Fig. 16.

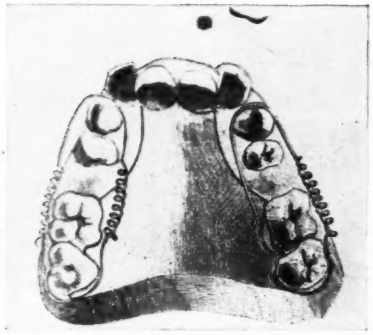


Fig 18.

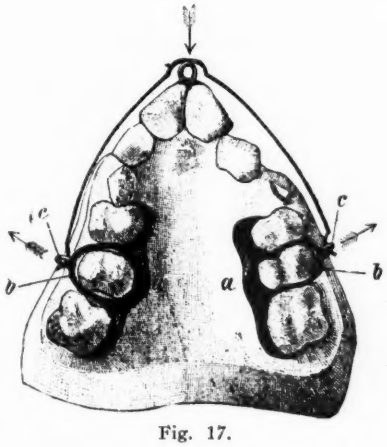



Fig. 17.

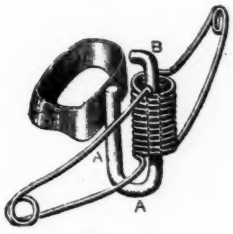



Fig. 19.

*"To Draw Receding Teeth into Position.*—A nicely made band is fitted to the irregular tooth. This done, a piece of wire is cut and soldered to the band, and the end of it bent up so as to form a hook, see Fig. 19a. The prepared band is now firmly cemented to the tooth. After this, separate the two wings

of the spring, slip the spiral on the hook *b*, and finally the end of it is bent over, so the spring of it is prevented from slipping off.

"*Retraction of a Tooth.*—As will be seen, this is a case where a forward growing cuspid is to be pressed backward. Here we have as a driving force only one wing of the spring.

"The band is fitted to the second bicuspid, and as shown in Fig. 20, *c*, a piece of half-round wire is soldered to the band on the lingual surface, starting from the first molar and ending at the first bicuspid. By this arrangement the spring is supported by three teeth. On the labial surface two wires, bent at right angles, are soldered, Fig. 20, *d.e.*

"Thus prepared, the apparatus is cemented to the second bicuspid. The spring is then placed on the bent wire *d*, and the end of the wire *e* is bent over

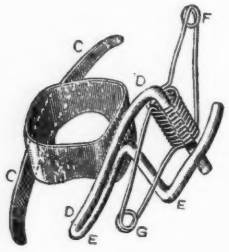



Fig. 20.

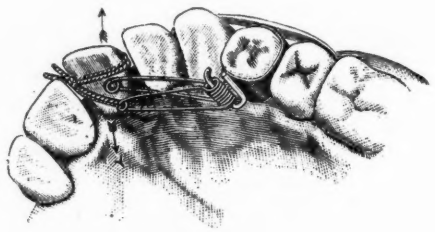


Fig. 21.

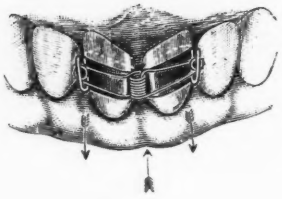


Fig. 22.

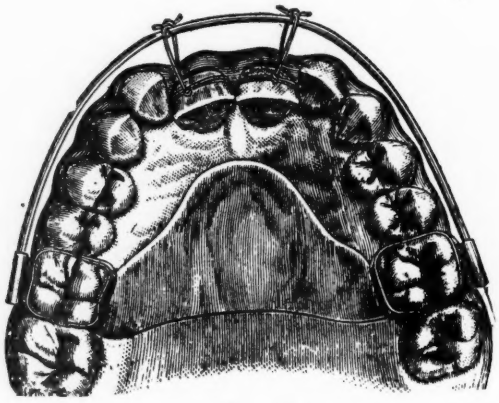


Fig. 23.

again to firmly hold the spring. The wing *f* of the spring exerts its power against the cuspid.

"*To Rotate One Tooth in Its Alveolus.*—In this case (Fig. 21), we use both wings as a driving force. This apparatus has much likeness to that just described, as it also consists of a band with a support soldered on the labial surface.

"After this device is fastened with cement on the first bicuspid, we at first turn the wings of the spring over one hundred and eighty degrees. Now we put the spiral on the hook *h*, so the wing, *i*, will press on the distal side of the tooth to be regulated, and operate in the direction of the screw *x*, Fig. 21.

"A silk ligature is now attached to the tooth, and the knot made on the labial surface. One end of the spring is drawn through the eye of the wing *k* and

fastened with the other end of the string to another knot, and the wing *k* will draw the tooth in the direction of the arrow *y*, Fig. 21. In this way the tooth is turned with perfect equality of action on both wings of the spring.

"*To Turn the Teeth at the Same Time.*—Among the many forms of dental irregularities the following cut, Fig. 22, represents one which is very common; the central incisors being situated more or less at right angles at the line of the arch. Both teeth are encircled by a well-fitting band. A hook is soldered on a little back of the space between the central and lateral incisors.

"Now the bands are fastened with cement, and we only have to put the regulating spring into use. The wire ends are to be turned over again. The arrows in Fig. 21 show the action of the spring."

*E. C. Kirk,* page 907, *Cosmos* 1891, *A New Regulating Device.* "The following contribution to the list of devices for correcting one of the more frequently

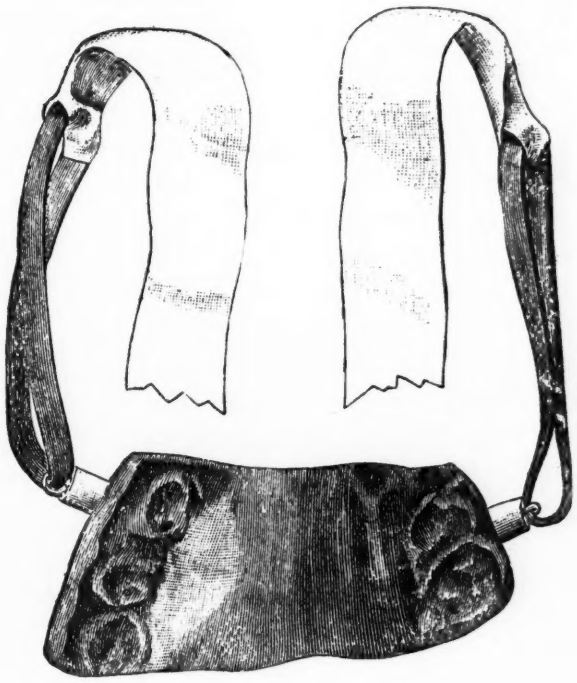


Fig. 24.

occurring forms of dental irregularities may be found useful. I have obtained very satisfactory results with it in the two cases where I have used it. The object to be accomplished in both of these was to move the incisors outward for the purpose, in the first instance, of increasing the size of the upper arch, and in the second instance, where the upper central incisors closed inside of the lower incisors, of correcting this defect.

"The appliance (Fig. 23), is constructed as follows: A broad clasp of platinized gold is thrown around each of the sixth-year molars, the opening of the clasp being at the distal buccal angle of the tooth or on its distal approximal surface. These clasps are yoked together by a narrow silver plate simply to give solidity to the fixture and cause the two molars to act as a single abutment. Upon the buccal aspects of each molar clasp is soldered a section of gold tubing about

three-eighths of an inch in length; the tubing used is the hinge-tubing of watch-case makers. The distal end of each tube is closed with a drop of gold solder. When the appliance is thus far completed, it is placed upon the model and a section of piano wire bent to conform to the arch, impinging upon the buccal aspect of the teeth about the middle of their crowns. The length of the piano-wire spring and the relation to its curvature to the labial aspects of the incisors is made such that its form will be that which the arch of the anterior teeth is to take and permanently retain, or, in other words, the wire is to be bent to the form of the arch which it is desired the teeth shall form when the correction is completed.

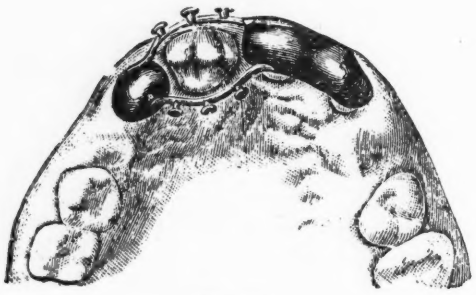


Fig. 25.

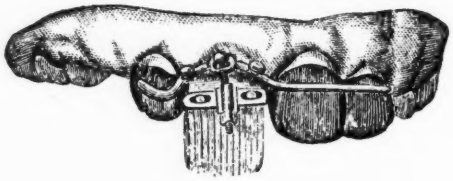


Fig. 26.

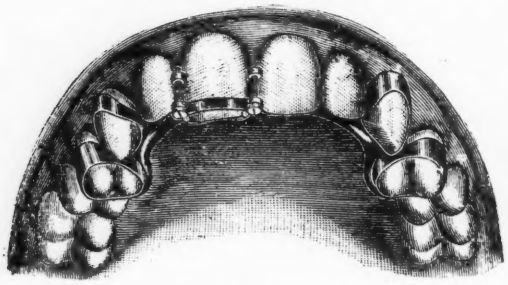


Fig. 27.

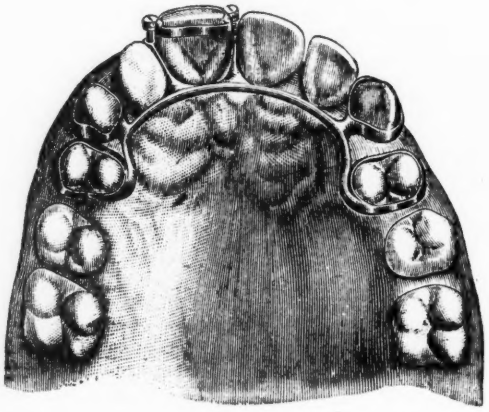


Fig. 29.

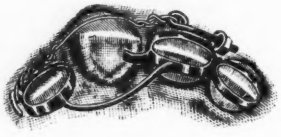


Fig. 28.

"The wire will now be approximately a U shape. The three extremities of the wire are to be cut to the proper length, so that when introduced into the tube-sockets with the fixture in position in the mouth the arch of the U will stand nearly one-quarter of an inch anterior to the incisors and about the middle of their crowns. After the fixture is adjusted in the mouth, the teeth to be moved outward are to be firmly ligated to the piano wire by means of fine gilling-twine or silk. The especial advantages of this fixture are that it is cleanly and easily removable for readjustment or cleansing. The traction force is exerted directly

outward in the median line, or if desired its direction may be modified by tying the ligature to the wire on either side of the tooth to be moved. The amount of force exerted is absolutely under control, and may be modified at any time by changing the length of the legs of the U-shaped wire, or by using a wire of smaller diameter, or by the method of tying the ligature to the wire.

"Not the least important advantage of the appliance as described is, that by having proper regard for the curve of the spring and length of its sides in relation to the curvature of the corrected arch, the fixture becomes practically automatic from the fact that the limit of resilience of the spring is reached at the moment the irregularity is corrected. Consequently, when the work of correction is done, the spring ceases to act. I have found much satisfaction in the use of electro-gilded piano wire not only in the cases described, but wherever I have occasion to use piano wire in regulating teeth. The deposit of gold is amply sufficient to protect the wire from oxidation during a reasonable time while in use in the mouth, and the unsightly staining of the teeth by iron salts is thus avoided. The gold surface is also an advantage when it becomes necessary to unite lugs, loops, or other fixtures to it by means of solder."

*Henry N. Dodge, Cosmos,* 1891, page 1045, *Reciprocating Tooth Movement.*

"It is now necessary to protect the tooth from contact with the lower incisors, for the diameter of the root where they touched it was much greater than the corresponding thickness of the upper left central. To keep the jaws asunder, therefore, an old upper plate which has been made for this case but discarded was now hastily cut down so as to cover the upper molars only, and as it was impossible to make it hold fast, two gold screw-eyes—convenient things to have at hand—were inserted into it, one near each angle of the mouth. The angles of the mouth were protected from abrasion by a bit of rubber tubing slipped upon the shank of each screw-eye; an elastic ring was put in the eye of each screw, and a ribbon fastened to each elastic; these two ribbons, tied at the occiput, held the plate in position. This plate is shown in Fig. 24. As soon as practicable this fixture, somewhat uncomfortable during mastication, was replaced by a lower plate, covering the molars, passing across the lingual surfaces of the lower oral teeth and reinforced by a half-round wire of platinized gold passing across the labial surfaces of the incisors and cuspids. The upper surface of this plate articulated with the upper molars, rendering mastication comfortable. The next problem in the case was to devise some appliance sufficiently powerful to force this conspicuously elongated tooth back again into its place. It was useless to rely on any fixture attached to the molars; they were even too short to support any appliance controlled by an occipital bandage. An occipital bandage attached to the tooth alone seemed to me crude, and ungovernable, and likely to result in injury to the tooth by displacement or irregularity and lack of delicacy in its action. *Dr. Herbst's* method of securing an implanted tooth by a strip of rubber-dam covering the crown of the tooth in question, perforated and slipped over the adjoining teeth and tied to their crevices, occurred to me; but these incisors had no crevices, and were too short to afford any such fastening. In this dilemma I concluded to make gold caps fitting the three unbroken incisors and cement them fast to the teeth, having first connected the three caps by gold wires passing across in front and back of the mended tooth, leaving an inter-

vening space around it. Upon each of these wires were soldered three gold buttons, as shown in Fig. 25.

"After allowing a few hours for the cement to harden, the patient returned and a strap of elastic rubber was made with three small holes punched in each end. These holes were slipped over the buttons at the front and back of the tooth, so that the elasticity of the rubber might force the tooth into place. The stretching of the rubber at the button-holes, however, made the appliance unsatisfactory, and several modifications resulted finally in the powerful combination of rubber strap and screw.

"The strap could be readily removed for cleansing and replaced in a moment, and by means of the key the nut could be turned as directed at the patient's home. The operation of this appliance is shown in Fig. 26."

Again in 1898 in the *Dental Cosmos* under *Reciprocating Tooth Movement: A Sequel, Dodge* wrote:

"I now present to the *Odontological Society,* at the request of its honored secretary, a sequel or appendix to the article previously published in the *Cosmos.*

"The left incisor has indeed grown, but not so much as was expected, the length of the teeth of the patient's parents being the criterion.

"I herewith present for examination two regulating appliances which have been used for the correction of the position of the mended incisor since the publication of my report of the case in 1891. Figs. 27 and 28, of which two views are shown, proved to be very powerful for the purpose of pushing up the incisor when the cuspids and bicuspids had grown enough to afford a fastening for the appliance. Fig. 29 was used for the rotation of the incisor back to its normal position, and its operation was faultless. The appliances will explain themselves on examination."

# THE CONTACT POINT—ITS RELATION TO THE GENERAL HEALTH*

By Walter R. Hughes, D.D.S., Oakland, Cal.

WEBSTER'S INTERNATIONAL DICTIONARY defines a contact as being the property of two curves, or surfaces, which meet, and at the point of meeting have a common direction. It is taken from *contigere* and *contactum*, to touch, a close union or junction, a touching or meeting.

The Standard Dictionary gives contact as the coming together of two bodies in space; or touching or meeting. The tangency of two surfaces or lines or one object with another.

The Century Dictionary uses contact as opposition of separate bodies or points without sensible intervening space. The act of making one body abut against another.

Thomas' Medical Dictionary defines contact as derived from *con*, together, and *tango, tactum*, to touch. The state of two bodies that touch each other.

Dr. Black defines the contact point as being a point on the proximal surface of a tooth which touches a neighboring tooth. In the first volume of his work, page 86, he further states: "In studying the buccal view, it will be seen that points of near approach of surfaces are very narrow and rounded in form from occlusal to gingival so that the actual touch point of unworn teeth is very small, like that of two marbles coming in contact, while in the view of the occlusal surfaces, the points of near approach to each other are shown to be much broader in bucco-lingual direction."

Bromell in defining the "interproximate spaces" says: "In the mesio-distal direction the crowns of the teeth are broader at their occlusal surfaces or cutting edges than at their necks." This bell-shaped form of the tooth crowns causes their proximate surfaces to touch at a point which is usually near the cutting edge. He also states "that the teeth of some types have a slight point of contact while those of other types cover a greater extent of tooth surface."

In Johnson's *Operative Dentistry* reference is made similar to this, "near the occlusal margin the surface is full and rounded, giving a point of contact for the proximal side."

All writers upon this subject agree that the contact points of the normal denture are similar to tiny little knives which assist in excising the food and directing it through the embrasures. A true contact point, then, has theoretically position but not magnitude. Not only do the contact points assist in triturating the food, but also each normal contact tends to take up the strain, stress or shock incident to masticating the food and transmit a part of the force to the adjoining teeth, so that each tooth will not battle alone.

The shape and color of the teeth blend with the complexion so that the mouth should have a harmonious relation with the other features. The con-

*Read before the Alameda County Dental Society, December, 1918; The Contra Costa County Dental Society, April, 1919; The Central California Dental Association, May, 1919. A revision of the paper of similar title which appeared in *The Pacific Dental Gazette*, June, 1919.

touring or rounding out of the teeth to form contact points upon the mesial and distal surfaces lends much to the characteristic beauty of the individual. It is this deviation on contours that renders the architectural appearance of the teeth different from a civil war cemetery with stones set all in a row.

The functions of the contact points are: to act as knives in excising the food during mastication; to act as shock absorbers or buffers, taking up and transmitting the shocks to prevent injury to the soft tissues; to assist in maintaining

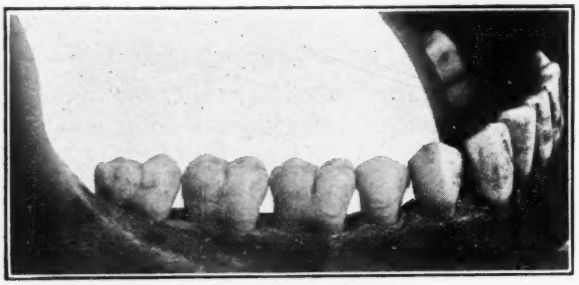


Fig. 1.—The contact point when viewed from buccal to lingual.

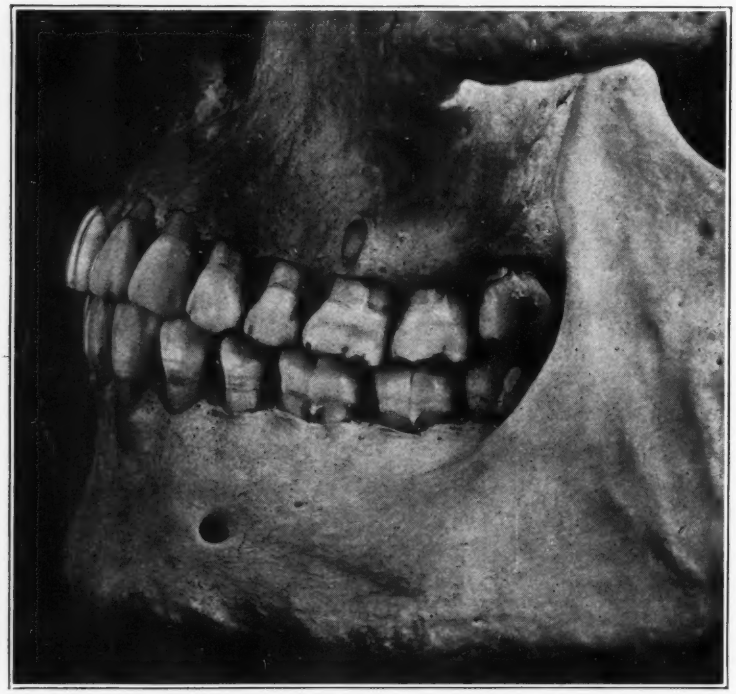


Fig. 2.—The contact points of the teeth. Buccal view.

the occlusal plane; to retain the mesio-distal width of the interproximal spaces; and to add to the appearance of the possessor.

Now let us consider the following forces that act to destroy the points of contact, and study methods for their correction.

1. Malocclusion.
2. Loss of contact by extraction.
3. Interproximal wear.

4. Faulty dental operations.
5. Plus contact in one jaw.

1. Malocclusion. Angle says: "Malocclusion of the teeth is the perversion of the normal relations of the occlusal inclined planes of the teeth when the jaws are closed." The pleasing symmetrical and beautiful lines of an artistic, intelligent face may be drawn into a deformity of ugliness, if the teeth are in malocclusion. Often the perpendicular development is greater in one portion of

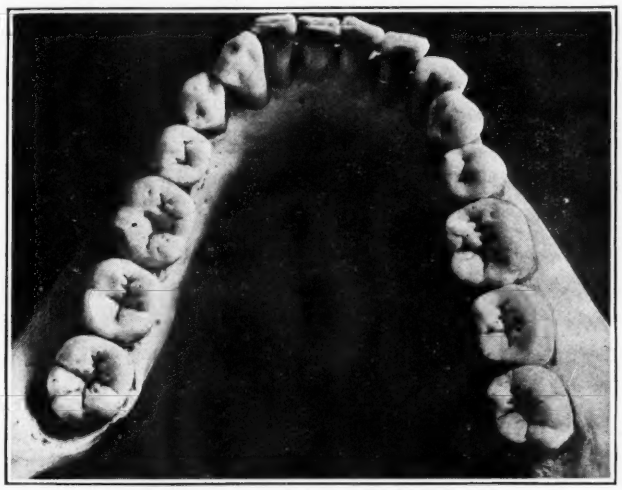


Fig. 3.—The contact points of the teeth. Occlusal view.

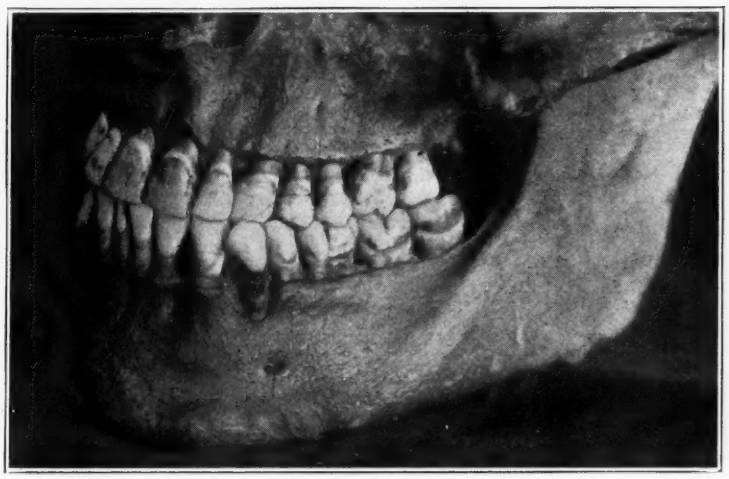


Fig. 4.—A loss of contact caused by the lower cuspid being deflected outside the normal alignment of the tooth. Note bone absorption at gingivæ.

the arch and causes an unequal strain or stress in that particular region. It is a common experience to find one or more teeth misplaced in either buccal, labial or lingual occlusion. However, any form of malocclusion will cause a loss of contact. Angle has laid down a rule which is applicable to general dentistry as well as orthodontia: "The best harmony and best proportion of the mouth in its relations to the other features requires that there shall be the full complement of

teeth, and that each tooth shall be made to occupy its normal position." Thus, if the operator in general practice should notice the teeth to be erupting out of their proper alignment, then it should be his duty to either correct the malocclusion himself, or send the patient to a specialist of orthodontia.

2. Loss of contact by extraction. What a noticeable inharmonious expression exists when a patient has lost a tooth or teeth. But the patient has suffered more than the immediate loss of the dental organ. If the operator does not insert an artificial substitute to retain the teeth in their proper relations, in a short time there will be a loss of contact of the teeth in that locality as well as those in the opposing jaw. The tooth without an opponent is extruded from its alveolus or deflected from its normal position, and as a result the contact either mesially or distally is lost. Whenever there is a loss of contact between two teeth the food crowds into the interproximal space and causes soreness and pain in that locality. This pain experienced by the patient while eating, rather increases the tendency to bolt the food, partly masticated. On the other hand, the lack of trituration of the food will tend to result in stomach trouble and allied complaints, thus jeopardizing the patient's health. It is plainly to be seen, then, that the loss of contact between two teeth, not only is a great discomfort to the patient, but causes inflammations to stomach or intestinal tract and allied maladies may en-

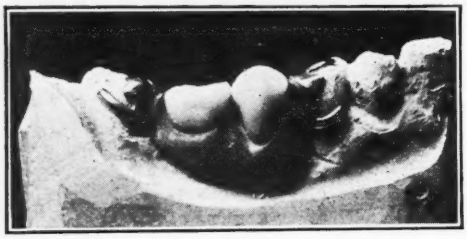


Fig. 5.—To restore the contact and occlusion for a few teeth a small removable bridge is made with a clasp on either tooth and a lug resting upon the occlusal surface of adjoining teeth.

sue together with the deeper inflammation of the area around the affected teeth which later may develop into a very stubborn case of pyorrhea alveolaris. The operator can best appreciate the value of the contact points if he has the efficiency of a few teeth impaired by the loss of contact points.

3. Interproximal wear. It is estimated that the length of the arch is shortened about one centimeter for a patient about forty years of age, by wear upon the interproximal surfaces. The interproximal wear increases as the patient advances in age. There is a continual pressure exerted upon the teeth to maintain them in their relative positions. Each tooth has a slight individual motion in its socket. This tooth movement occurs each time the patient closes his teeth. The interproximal wear is the result of slight, but continual, tooth motion. These wears occur upon the teeth performing the greatest amount of work, frequently being exaggerated upon molars and bicuspids where the biting stress is the heaviest. If these wears continue unchecked for an indefinite time, the result will be an injury to the gingivæ. The continual lodgment of food between the teeth will either cause a beginning of decay in the gingival area or set up an interproximal irritation in the soft tissues which finally results in pyorrhea alveolaris.

The contiguity of the approximal surfaces of the teeth greatly favors the retention of food and the harboring of microorganisms. How much greater the liability both to decay and pyorrhea when the food is allowed to crowd past the contact point.

The treatment for such cases suggests itself. The need for eradication of this fault in the dental apparatus is more emphatically impressed upon the operator if he has been a like sufferer. But in passing a subject of such importance the writer wishes to emphasize the necessity of wearing a separation of gutta-percha for from one to ten weeks or until a filling can be made with a normal contour. This may be either a gold foil filling, an amalgam filling, or an inlay, as the case in hand may demand.

4. Faulty operations. Too often the mesio-distal measurement of the arch is shortened by faulty dental operations. Fillings are made with no contour. Sometimes fillings are seen that do not approximate each other with any semblance of a contact point. Yes, sometimes approximal fillings resemble a letter S in appearance. Such operations should be removed and base-plate gutta-percha placed in the cavity until the required interproximal space has been secured.

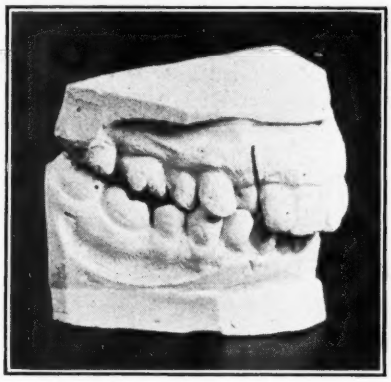


Fig. 6.—An upper lateral incisor is deflected lingually, and held in malocclusion by the lower cuspid.

This space must be wide enough to insure a normal contour to the finished operation and a free circulation of blood in the gingivæ at this point. The best result will accrue to the operation if the gutta-percha is changed every three or four days until the distance between the teeth will permit a finished operation to be made.

If much looseness has occurred to the tooth a gold inlay makes the best material to use, or a good silver amalgam would make an ideal second choice. The Crandall method of amalgam contours insures a perfect result when used with caution. Whether this or some method equally good is used care must be observed to finish the amalgam into nicely rounded contours and insure a perfect contact point.

5. Plus contact points. The plus contact point is frequently noticed with the lower six anterior teeth. The lower jaw seems relatively too large for the upper jaw. When the patient closes the jaws the lower teeth occlude too hard against the upper front teeth. This causes the upper front teeth to lose their contacts and finally results in their separating in that ugly fan-shaped appearance. It

seems almost impossible to restore the beauty to the mouth when this has taken place. When the individual tooth-pattern of the lower teeth is a little too wide for the segmental outline of the upper denture or the interproximal wear has been greater upon the upper teeth or probably no wear has taken place upon the lower teeth a pressure is exerted too great for the labial plates of bone of the

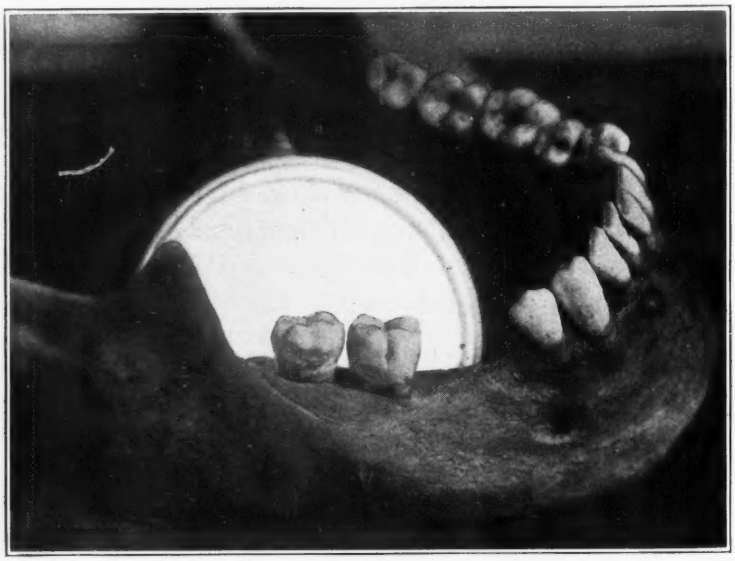


Fig. 7.—The contact point was destroyed by the extraction of teeth mesial to the molar. As a result of the loss of the mesial support fibrous foods would crowd into the interproximal space and injure the tissues resulting in pyorrhea alveolaris.

Fig. 8.—The early loss of the first bicuspid caused an arrested bone development in this region. As a result there was an unequal biting stress placed upon the lingual surface of the upper central incisors and labial surface of those of the lower jaw. Note the absorption.

upper and lingual plate of the lower. This causes a bone absorption and finally results in pyorrhea in both localities.

A treatment for this case might save the front teeth of both jaws if taken in time. With a "lightening strip or disk" reduce the width of the lower teeth. The treatment if stopped now would be only partly successful. With a good

stone also reduce the length of the lower teeth until the articulation is as near normal as can be made. After the occlusion and contacts have been reduced to as near a normal condition as possible, polish the teeth.

If one hopes to successfully treat pyorrhea one must observe these three cardinal principles or the pyorrhea treatment will not be successful. The three conditions of a perfect treatment are:

1. Thorough root surgery must be performed.
2. Proper occlusion must be maintained.
3. Correct points must be retained.

If you fail in one, you have failed in all. The manifestations of foci of infection upon roots of teeth will not be completely obliterated.

It is asked, "why bother with so small a thing as a point of contact?" In this bundle of sticks are thirty-two pieces of wood. If each is taken separately only slight force is required to break it yet when the thirty-two are "en masse" it would require many times more force to break the bundle than when each is

Fig. 9.—Loss of proper contacts between lower incisors due to a crowded condition which was induced by an early loss of upper right first bicuspid.

taken separately. So with the teeth. Each tooth braces its fellow. The teeth are held apart by the contact points. While the contact points approximate each other with some degree of force, yet there is sufficient room at the gingival to allow a free circulation through the soft tissues and to give a protection to the pericemental fibers. On the other hand, should the contact points become flattened or destroyed by approximal wear or by caries the approximating teeth would touch each other with flat sides or surfaces which would tend to cut or injure the delicate fibers and cut off the circulation at that point. Not only, then, is the normal contact of the teeth on their approximal surfaces essential for lateral support, but the correct contacts are found equally necessary for the protection of the gingival tissues during mastication. Therefore, a restoration of a normal contour affords protection to the delicate gingival tissue by preventing the lodgment of food in the interproximal spaces. This bridging over of the interproximal space by the contact points renders a protection to the gingival

tissues and assures a normal circulation, protects the pericemental fibers and as a result assures health to the part.

In studying the anatomic formation of the teeth it is observed that nature has placed the contact points on the approximal surfaces of the teeth to outline a natural form to the particular tooth. It is architecturally formed to perform the functions assigned to it. The incisors and cuspids are given forms to excise or cut the food, while the bicuspids and molars are produced in forms best suited to grind the food. It is also observed that the contact points are placed upon the tooth surface in such a manner as to lend comfort to the possessor and add a useful life to the teeth. Another function of a perfect point of contact is to

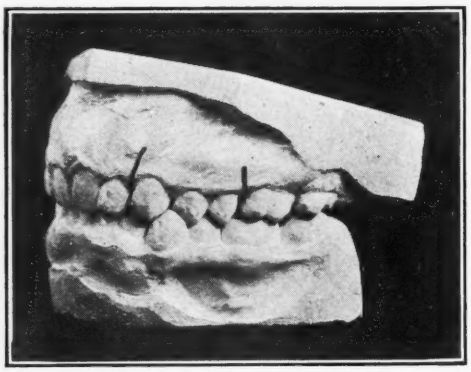


Fig. 10.—An undue pressure upon the lingual surface of both upper lateral incisor and distal surface of the cuspid caused a bad pocket in this region. A pathological condition developed between the bicuspid and molar on account of bad filling in the distal surface of the bicuspid.

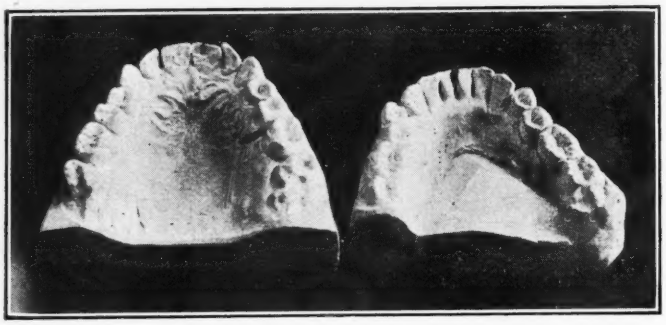


Fig. 11.—A lingual view of same case. Note bad pocket between bicuspid and molar, and wears upon incisal margins of front teeth. This tends to destroy contacts.

lessen the liability of decay upon tooth surfaces or to render them immune to decay. When making operations upon the approximal surfaces of the teeth the operator should, as far as possible, make a replica of the normal contour and of the points of contact, thus rendering a very useful service to his patient. The original contour should be added to the flattened or worn surface, and the carious tooth restored to a requisite contour if the patient is to have everyday comfort and as far as possible be rendered immune to disease of the gingival tissues.

Health is the greatest asset that the human body can possess. It should not be jeopardized by faulty dental operations. In balancing accounts or taking stock of our conditions it is observed that health is the most valuable of all things

possessed. It is said that 60 per cent of the ordinary diseases of the human family are caused by lack of attention to the mouth. A duty which every dentist owes his patient is to advise the services which when rendered, will maintain him in as high a standard of health as possible. On the other hand, should the patient be in ill health or not quite up to the normal standard of health, see if a faulty or leaky contact may be held accountable for his condition. Correct contact points are just as conducive to good health as the food that is eaten or any precautions the patient might take to defeat sickness. Correct contact points are the links in the chain that lead to good health, but if one of the links is broken, it not only leads to a loss of teeth, but is a causative factor in the production of oral sepsis. Look well to your contacts.

Fig. 12.—The efficiency of the mouth is lost on account of the destruction of the occlusion and loss of contacts.

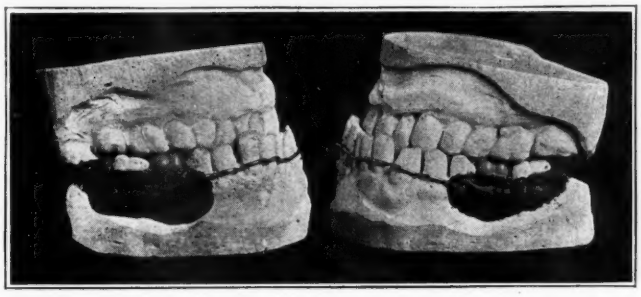


Fig. 13.—The locking of the bite and unequal biting stress caused a loss of contact of all the lower teeth and resulted in pyorrhea alveolaris universally about the mouth.

Dr. Charles H. Mayo said: "It is evident that the next great step in medical progress in the line of preventive medicine should be made by the dentists. The question is, will they do it?" Now that the dental profession has a full knowledge of the physiologic functioning of the mouth as an important organ of the bodily economy, we readily observe that the duty of the dental profession is not simply one of "mechanical repairs." But its duty to the healing art is to make those "mechanical repairs" as near a replica of nature as human skill will permit.

There is no pathologic difference existing between a case of tonsillitis and a suppurating condition of the gingivæ. These septic conditions of the gingivæ are often induced by a loss of the contact points. The great surgeon of the day recognizes sepsis as the most potent factor of infectious disease found. The dentist will go a long way in aiding the physician to check the cause of a large

number of diseases by making operations upon tooth surfaces which will not maintain a hidden cause of oral sepsis. The missing link in the chain of evidence which has deterred the physician from making the correct diagnosis may be septic dentistry. Is it any wonder then that the physician, knowing himself defeated in his diagnosis and treatment of many diseases, on account of oral sepsis, desires the dental surgeon to meet him on terms of equal responsibility? The dental profession must realize the fact that the continuance of the patient in good health depends upon the underlying principles of oral antisepsis. Whether it be follicular tonsillitis or suppurating gingivitis, the pathologic condition is the same, namely, sepsis. The responsibility of the dental profession to the general health of the patient rests in making operations in the mouth which will not be a source of septic infection in the mouth or a source of sepsis to the body. Therefore, make your approximal operations with contact points sufficiently strong to insure the health to the surrounding tissues.

In orthodontic operations an endeavor should be made to obtain as near a normal occlusion as the case will permit. The retainers should be maintained until sufficient bony substance has been deposited around the roots of the teeth to retain permanent contact points between all the teeth. The operator will go a long way toward preventing the occurrence of pyorrrhea alveolaris later in the patient's life by reducing the long cusps and widening the narrow sulci. This, if observed, will prevent the locking of the bite which becomes so disastrous if not corrected. Another invaluable service is rendered the patient having a great difference in measurements of the two jaws by reducing the contact points of the jaw having the greater measurement. This will also reduce the predisposing causes of pyorrhea to a minimum. All this is a material aid to the orthodontist in maintaining healthful permanent interproximal spaces with good contact points.

# *DEPARTMENT OF*
# *ORAL SURGERY AND SURGICAL ORTHODONTIA*



## CLEFT PALATE AND HARELIP

By Vilray P. Blair, A.M., M.D., F.A.C.S., St. Louis, Mo.

WHEN Nature fails to close one or any of the facial clefts at the normal time, then the earlier her work is completed by the surgeon the better, from the standpoints of appearance, health, function, and mental development.

### APPEARANCE

Fig. 1 is sufficient argument to dispose of the question of appearance.

### HEALTH

Long observation has convinced me that those children with open lip and palate clefts are more subject to respiratory infections than normal children, and unless the most intelligent care is exercised, their nutrition is not as good.

### FUNCTION

Here this chiefly refers to one of our important equipments for life's battles, speech. The earlier the cleft palate is repaired, the better will be the speech for that individual.

### MENTAL DEVELOPMENT

Mental development depends largely on our intercourse with humans, and defective speech is a greater or less handicap.

The results desired are normal appearance and normal function, or the nearest attainable approximation to them. These can not be accomplished by surgery alone, but to reach the greatest perfection, or often even an acceptable mediocrity, the intelligent cooperation of the surgeon, the teacher trained in the correction of speech defects, and the orthodontist is required. As the work of the surgeon is the foundation upon which the other two will work, his aim should not be to simply close the clefts, but also to leave the normal anatomy as little disturbed as possible. The teeth and nerve supply should not be crippled or the maxillary arch unduly distorted. Contraction of the nasal fossæ is one of the worst things that can happen to a growing child. Any or all of the above

Fig. 1.

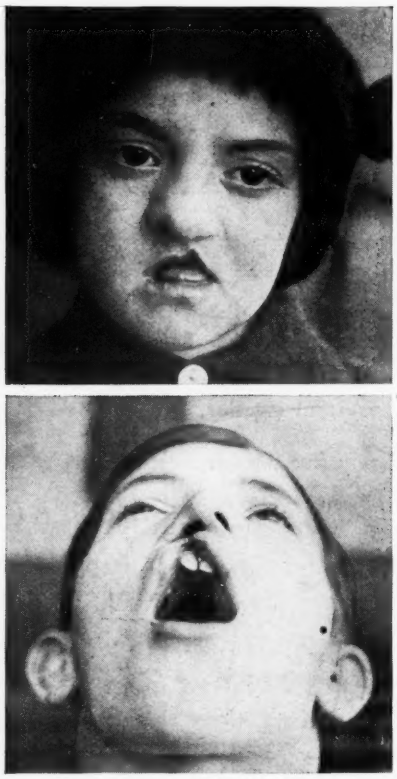


Fig. 2.

Fig. 1.—A single complete cleft of lip and palate operated at twenty-four hours, and the result eight days later.

Fig. 2.—At the top is shown a child that had a poor lip repair in early infancy. Besides the lip notch, notice that the bridge of the nose is drawn to the opposite side. The lower figure shows the inferior view of the same condition in an older child. It also shows the closure of the alveolar process which has occurred even after a poor lip repair.

Fig. 3.—A starved child which later died of inanition. Was breast fed and because the child was able to draw some milk this was thought to be sufficient. A baby sucks both by creating a partial vacuum and by biting the breast at the same time. A cleft palate baby can create no vacuum, but can often draw some milk by compression. When this is so it should be allowed to nurse for the regulation number of minutes each feeding, but this should be supplemented by a feeding from a bottle that has a large hole in the nipple; preferably with mother's milk. The writer has encountered one infant with a single, complete palate cleft, who learned to nurse efficiently by placing the nipple under its tongue and closing the cleft with the dorsum of the same.

mishaps may follow if only the immediate surgical result is regarded, especially when very early closure is attempted.

In either single or double complete cleft of the lip and palate, the cleft will be found to be as wide as the alae of the nose will permit and the premaxilla

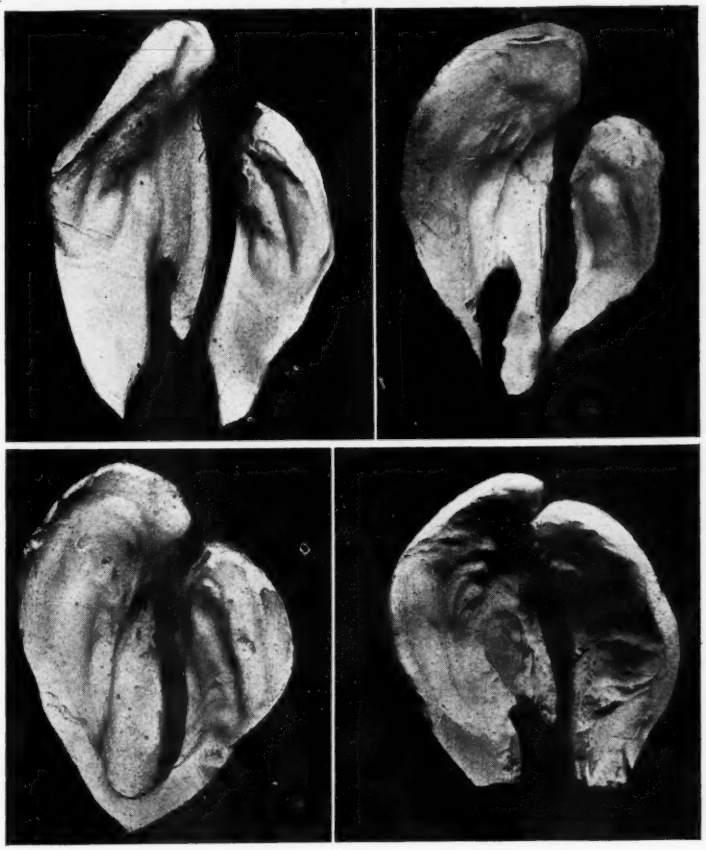


Fig. 4.—Shows the closure of the alveolar part of the cleft that will usually occur when the lip is repaired. The upper right picture is of a cast made of a cleft palate in a child twenty weeks old. At this age it is not good practice to forcefully close the alveolar part of the cleft, but the lip was repaired. The other three casts were made at twenty-three, thirty, and forty-four weeks, respectively, and show the gradual closure which occurred from the lip pressure without any damage to the developing teeth.

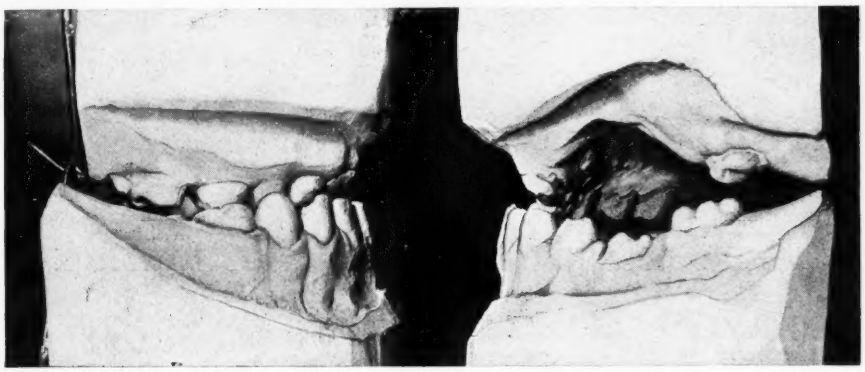


Fig. 5.—This cast, made from the teeth of a child five years old who had a Brophy operation for a complete single cleft at three months, shows a complete loss of teeth on one side with no destruction of the teeth of the other side. This illustrates that a Brophy may or may not injure the tooth buds, depending, probably, upon just how much they are damaged in putting the wires through the bone. Besides loss of teeth, the arch is contracted anteriorly and laterally, but not too much so for orthodontic correction if sufficient teeth erupt.

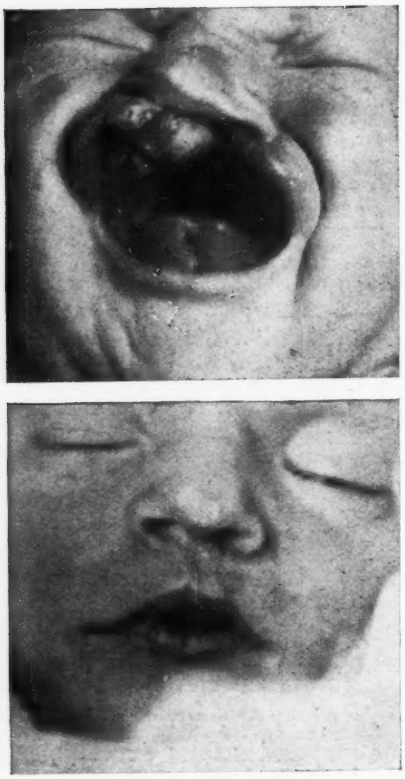


Fig. 1.

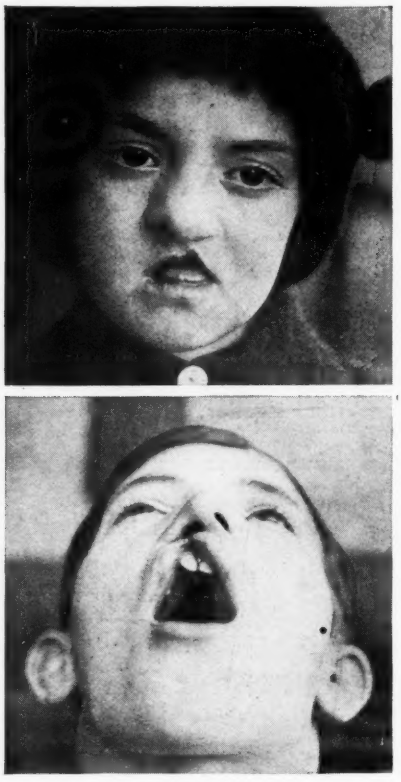


Fig. 2.

Fig. 1.—A single complete cleft of lip and palate operated at twenty-four hours, and the result eight days later.

Fig. 2.—At the top is shown a child that had a poor lip repair in early infancy. Besides the lip notch, notice that the bridge of the nose is drawn to the opposite side. The lower figure shows the inferior view of the same condition in an older child. It also shows the closure of the alveolar process which has occurred even after a poor lip repair.

Fig. 3.—A starved child which later died of inanition. Was breast fed and because the child was able to draw some milk this was thought to be sufficient. A baby sucks both by creating a partial vacuum and by biting the breast at the same time. A cleft palate baby can create no vacuum, but can often draw some milk by compression. When this is so it should be allowed to nurse for the regulation number of minutes each feeding, but this should be supplemented by a feeding from a bottle that has a large hole in the nipple; preferably with mother's milk. The writer has encountered one infant with a single, complete palate cleft, who learned to nurse efficiently by placing the nipple under its tongue and closing the cleft with the dorsum of the same.

mishaps may follow if only the immediate surgical result is regarded, especially when very early closure is attempted.

In either single or double complete cleft of the lip and palate, the cleft will be found to be as wide as the alae of the nose will permit and the premaxilla

Fig. 4.—Shows the closure of the alveolar part of the cleft that will usually occur when the lip is repaired. The upper right picture is of a cast made of a cleft palate in a child twenty weeks old. At this age it is not good practice to forcefully close the alveolar part of the cleft, but the lip was repaired. The other three casts were made at twenty-three, thirty, and forty-four weeks, respectively, and show the gradual closure which occurred from the lip pressure without any damage to the developing teeth.

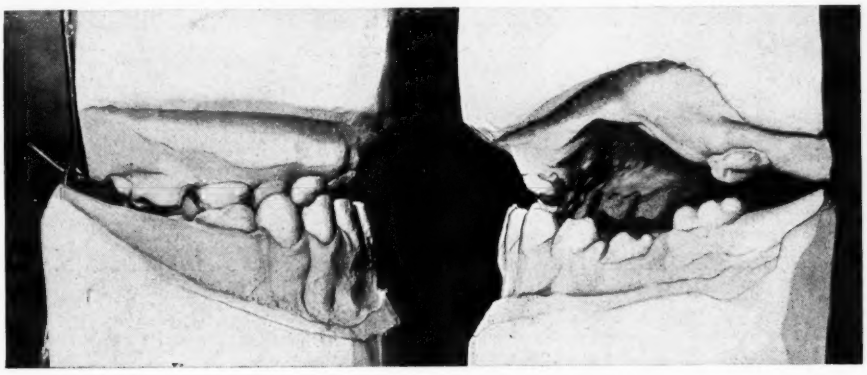


Fig. 5.—This cast, made from the teeth of a child five years old who had a Brophy operation for a complete single cleft at three months, shows a complete loss of teeth on one side with no destruction of the teeth of the other side. This illustrates that a Brophy may or may not injure the tooth buds, depending, probably, upon just how much they are damaged in putting the wires through the bone. Besides loss of teeth, the arch is contracted anteriorly and laterally, but not too much so for orthodontic correction if sufficient teeth erupt.

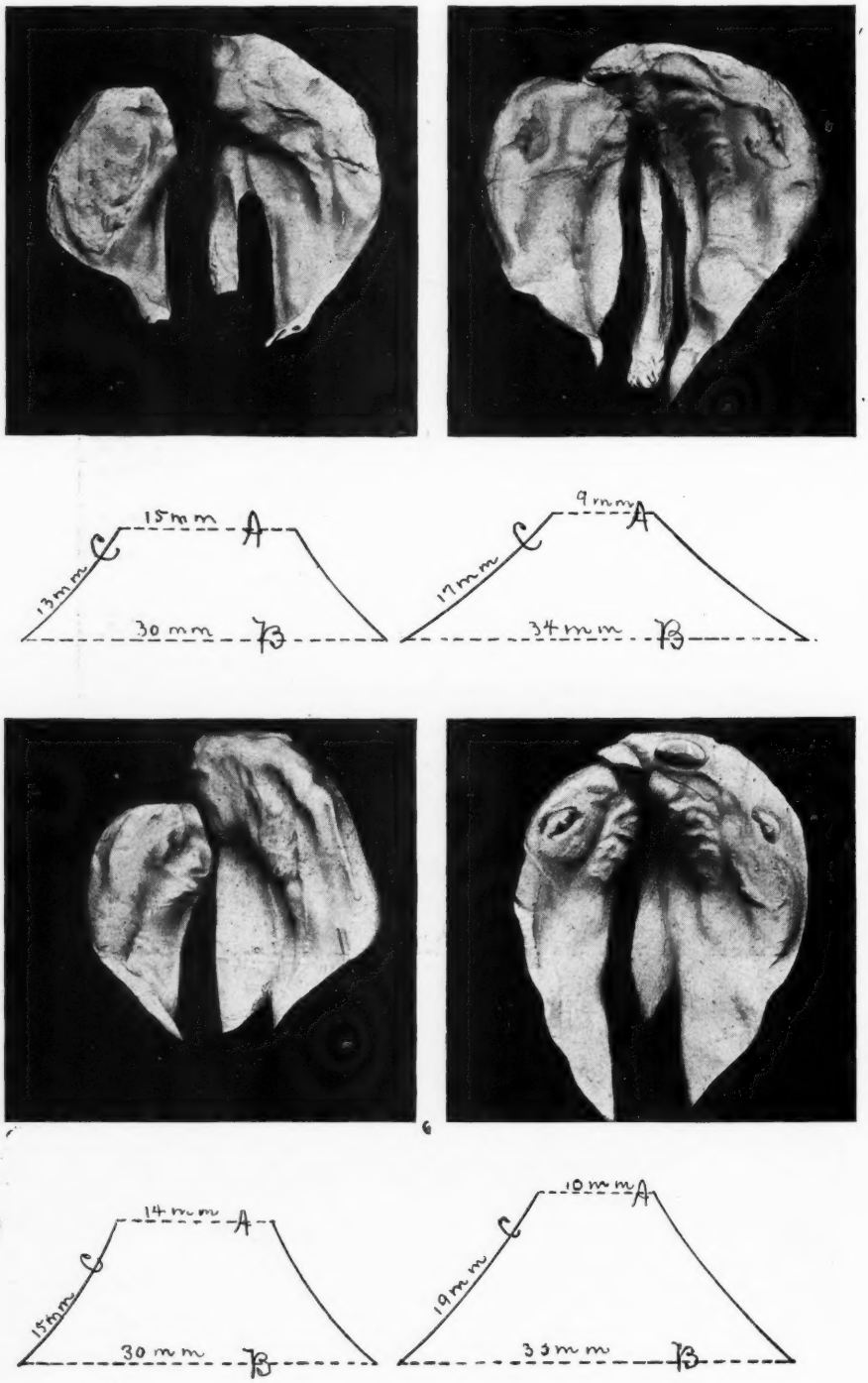



Fig. 6.—The two casts in the top row show a case in which the alveolar approximation was made by a single wire passed through both maxillæ and twisted around in front of the premaxilla, while in the case recorded by the two lower casts, a typical Brophy was done which, though it gives a better position to the premaxilla, has little ultimate effect upon the width of the posterior part of the cleft. This will be appreciated by a study of the diagrams below each cast which are supposed to represent coronal sections through the casts at the posterior border of the hard palate. These give, in millimeters: *A*, the width of the cleft; *B*, the distance between the alveolar processes (the space that must be filled by flaps in the subsequent von Langenbeck operation), and *C*, the amount of available palate tissue from which the flaps are obtained. It will be seen that the width of the cleft and of the posterior part of the hard palate has decreased and the available palate tissue has increased about the same amount in each case regardless of the type of operation.

sprung forward, but with comparatively little tissue really missing. The width of the cleft is almost entirely due to an abnormal separation of the maxillæ, but I do believe there is always some of the alveolar process missing, at least if the cleft borders are freshened and the segments adjusted to form a completely rounded arch, it will always be found smaller than normal.

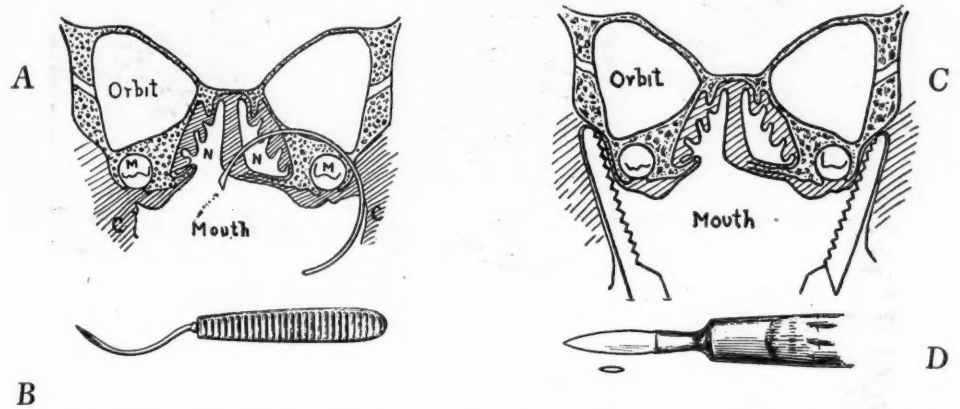



Fig. 7.—*A*, an accurate diagrammatic reproduction of a section of a head of an infant with a single cleft of the palate. This illustrates how a 5/8-circle needle (*B*) can be made to pass from the upper buccal fornix through the jaw bone, along the floor of the orbit and into the cleft. *C*, showing the position of the jaws of the forceps in forceful approximation of the maxillæ. Pressure on the alveolar process, only, may fracture it. *D* is the double-edged knife we occasionally use in cutting the maxilla. The knife is thrust high into the body of the bone through a small mucous opening and moved forward and backward in the bone. Notice that there is no antrum between the teeth buds and orbit.

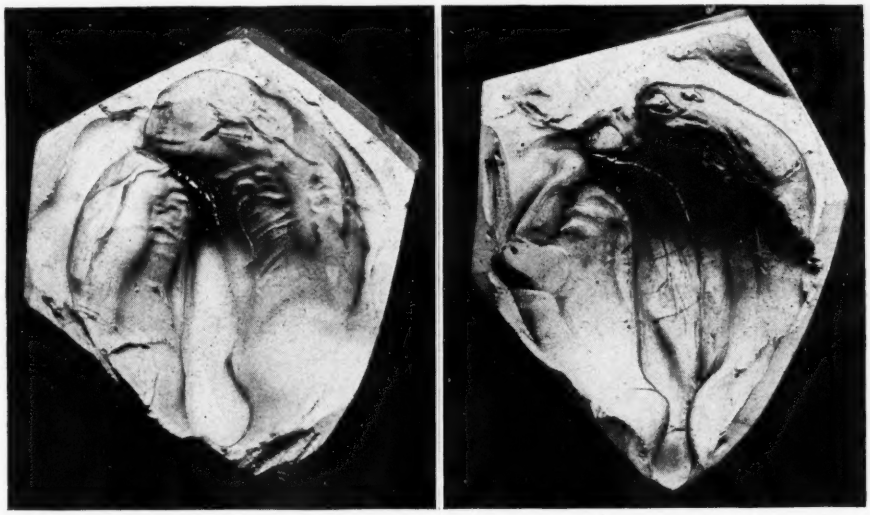


Fig. 8.—Shows on the left a proper and on the right an improper position of the premaxillary bone after the closure of the alveolar cleft. In the latter instance the anterior part of the palate cleft remains wide and difficult to close and is apt to be accompanied by a flat upper lip. (See Fig. 9.)

Early closure of the lip over an open alveolar arch will cause the cleft to contract and eventually close, and gives a very good contour to the arch (Fig. 4).

The Brophy operation allows an earlier satisfactory closure of the lip and of the palate; if the tooth sacs are not invaded and not too much is attempted, I believe it is free from the objections so frequently urged against it. Considerable misapprehension is abroad regarding what is to be expected from this operation

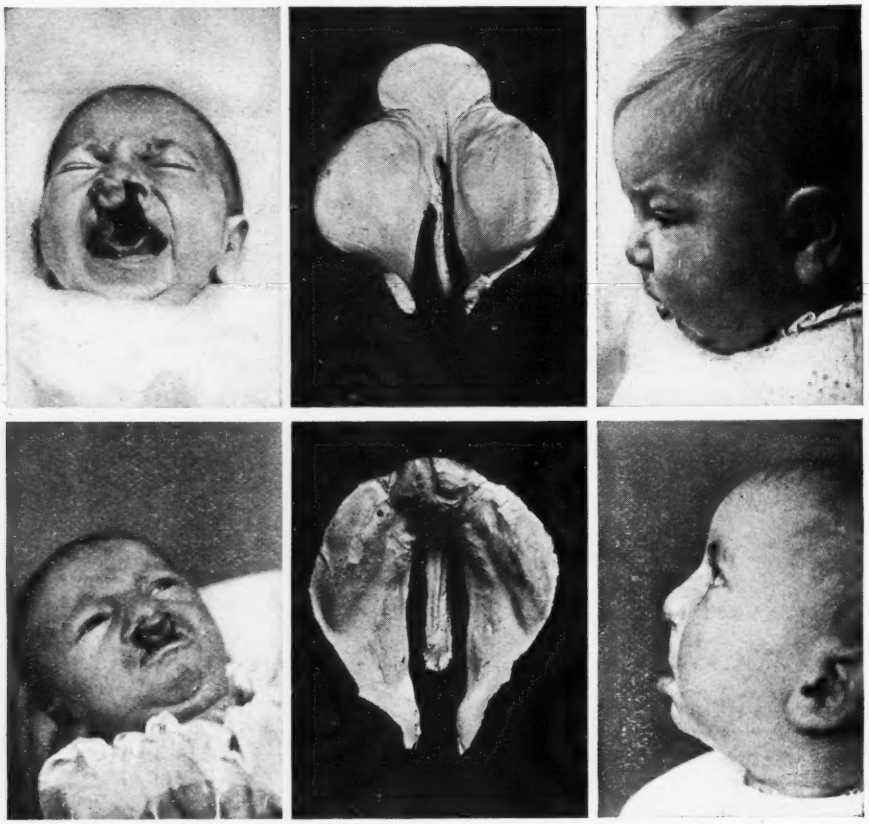


Fig. 9-*A*.—In the cast in the first case a proper relationship is shown between the premaxillary and the maxillary bones, the latter being drawn close together in front so that the premaxillary rests in front of them. This gave the good lip shown in the photograph to right. Notice how the plane of the upper lip is in front of that of the chin which is correct in a baby. In the case represented by the lower row of pictures the premaxillary bone has been allowed to slip back between the maxillæ which gives a wide anterior part of the palate cleft, very difficult to close, and the very ugly flat upper lip which is on the same plane as the chin. By our best efforts it is not always possible to avoid the latter fault, but it can later be corrected by orthodontic procedure.

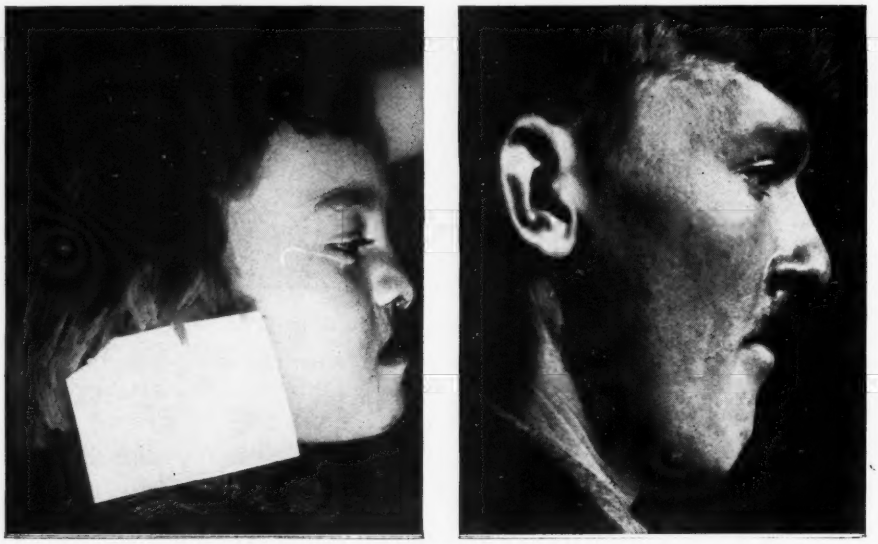


Fig. 9-B.—The face to the right shows the facial deformity that may result from placing the intermaxillary bone too far back, while in the one to the left the intermaxillary bone has been removed. The latter procedure can not be too strongly comdemned. In the first instance the defect can be corrected by orthodontia, while the appearance of the second case can be greatly improved by prosthesis.

and attempts to forcefully close the whole or the greater part of the cleft are responsible for the cases of distortion or loss of part of the arch or the contracted nasal fossæ that have occurred (Fig. 5). In doing this operation, any efforts are limited to closing the alveolar arch with the best possible relationship between the premaxilla and the maxillæ, and to the narrowing of the anterior part of the maxillary cleft (Fig. 6). Wires that approximate the two halves of

Fig. 10.—Case of boy 19 months old in whom a wide alveolar cleft closed spontaneously without any surgical aid.

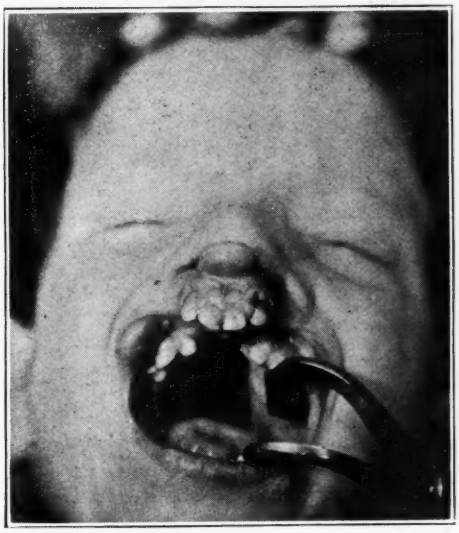


Fig. 12.—Shows broad premaxilla easily set in front of the maxillæ and not slipped between them.

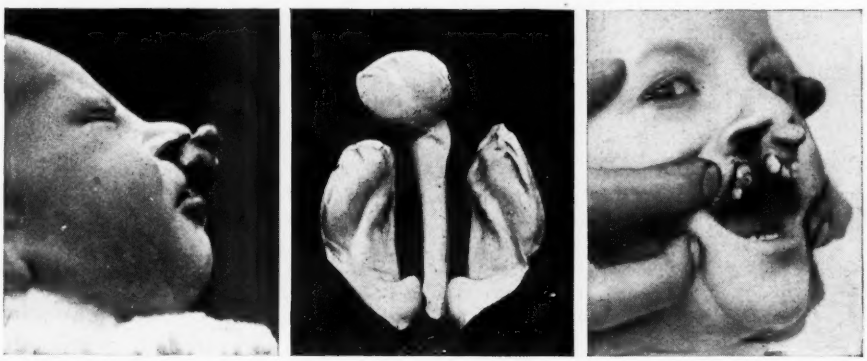


Fig. 11.—The first two figures are a photograph and a cast of a case of complete, double cleft; showing the typical forward position of the premaxillary bone and prolabium. If this is left unoperated this position will persist, but an early correction of the position of the premaxilla will be followed by a proper development of the columella and tip of the nose without the aid of any special plastic for this purpose. (See Figs. 14 and 15.) The third picture is of an unoperated case, twelve years old, showing that no spontaneous change has occurred in the relative position of the premaxilla.

the maxilla are passed through the orbit in contact with its floor and not through the tooth sacs (Fig. 7). There is neither necessity nor expediency in even materially narrowing the posterior part of the maxillary cleft at this time, and attempts to do so court immediate and ultimate disaster and are largely responsible for the operation not being universally adopted.

The position given the premaxilla is most important; it should be in front of the maxilla and not pressed into the cleft between the maxilla. The latter

Fig. 13.—Shows good full lip obtained by replacing the premaxilla and repairing the lip.

Fig. 14.—Shows two babies having a recent proper operation for double harelip with protruding premaxilla and prolabium. Notice the snubbed nose and slit-like nostrils which will correct themselves. (See Fig. 15.)

gives a short upper jaw, a flat lip, and renders the subsequent closure of the anterior part of the intermaxillary cleft most difficult. (Compare Fig. 8 with Figs. 4 and 6.) Later the orthodontist is called upon to correct the following condition: a very much retracted anterior part of the arch with a small fistula into the nose, just behind the alveolar process and what the parents have come to regard as relatively unimportant. Unless firm bony union of the alveolus across the former cleft has occurred, in expanding the arch, the cleft is apt to reopen and the small fistula to be converted into a large hole; it will be well to have foretold this.

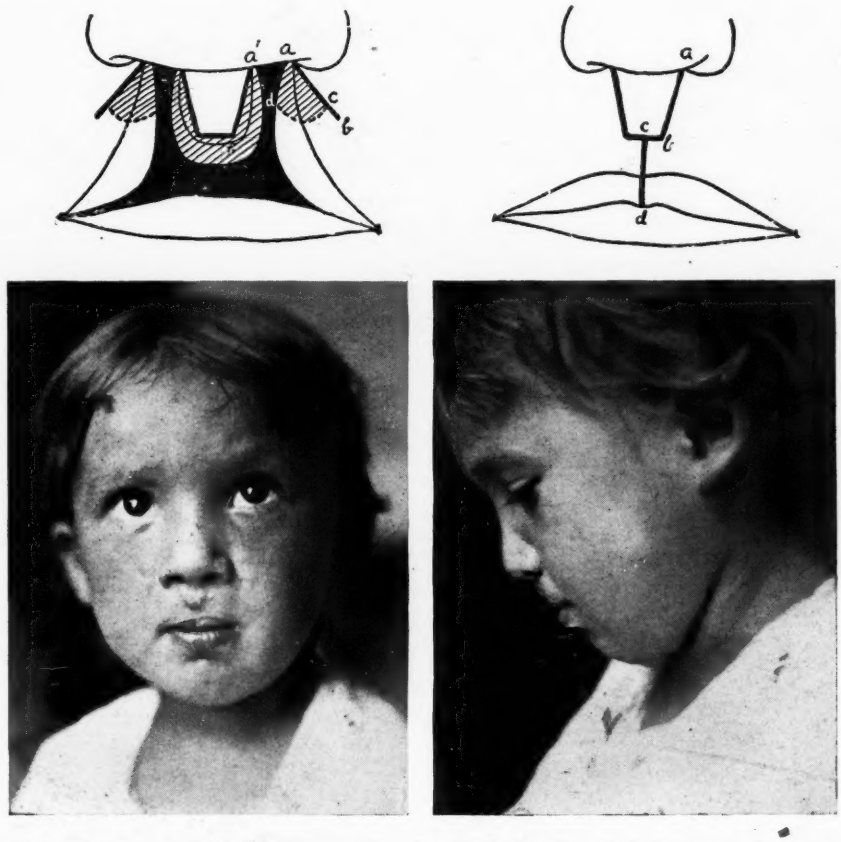



Fig. 15.—Showing a modified Maas operation for double harelip which for want of a better designation we have called the "Washington University Operation." The child shown below had this operation done in early infancy and at first gave the appearance shown in Fig. 14, but notice the beautiful development of the nose that has taken place spontaneously. The defect in the middle of the lip is due to inadvertently leaving a small bit of the vermillion border of the prolabium.

The proper treatment of such a case is to expand the arch to its proper shape and to repair the opening by a flap operation; the reopening of the cleft facilitates the latter.

With a single cleft, I have seen the premaxilla retract and the alveolar cleft close spontaneously, but not so with the complete double cleft where the premaxilla and prolabium will remain forward indefinitely. In the unoperated double cleft, the maxillæ will approximate somewhat so that in replacing the premaxilla it will remain in front of and not all between them (Figs. 10, 11, 12, and 13). Its proper early replacement will be followed by some snubbing of the nose, but this disappears with subsequent growth (Figs, 14 and 15).

The closure of the posterior part of the cleft in the hard and the soft palate can be done after a proper "Brophy" at seven months to a year; after simply closing the lip, it may have to be postponed longer (Fig. 16).

The narrowing of the cleft that follows the "Brophy" or the early lip closure only anticipates what will follow naturally with growth. Though the alveolar

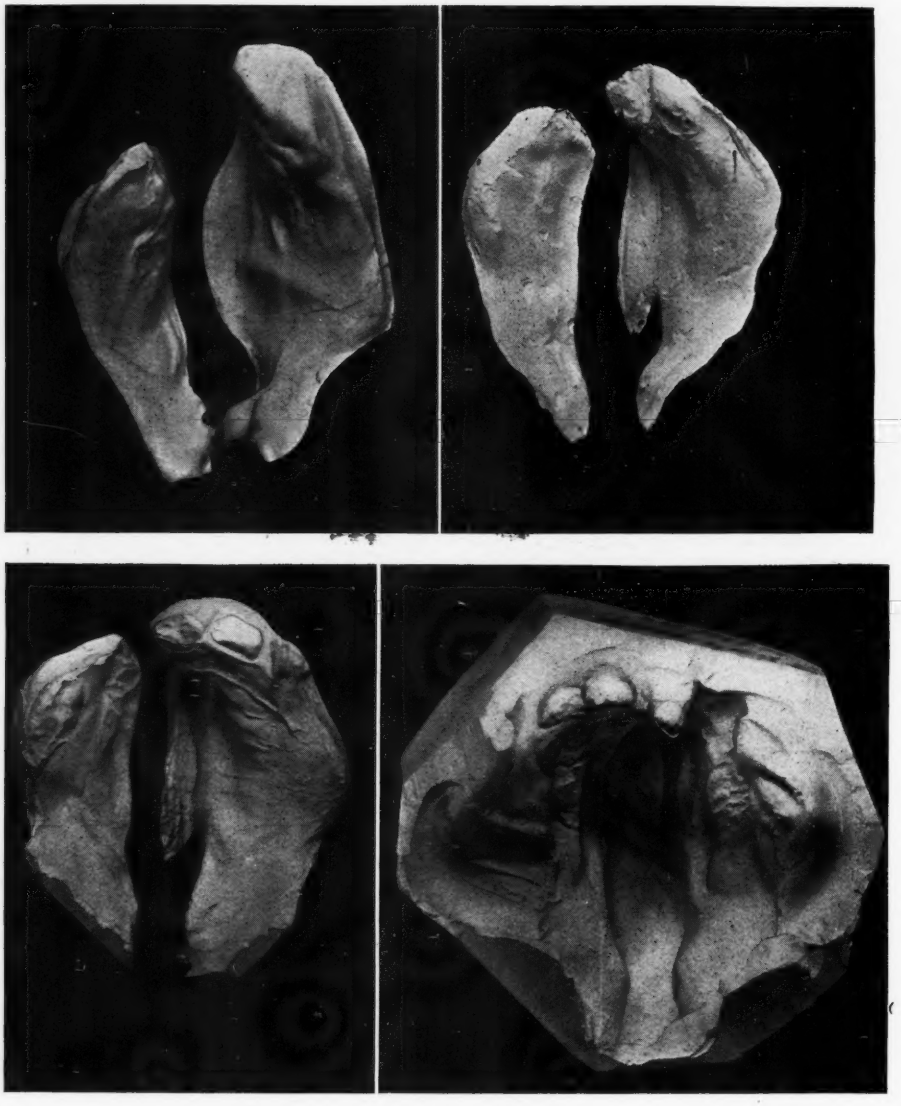
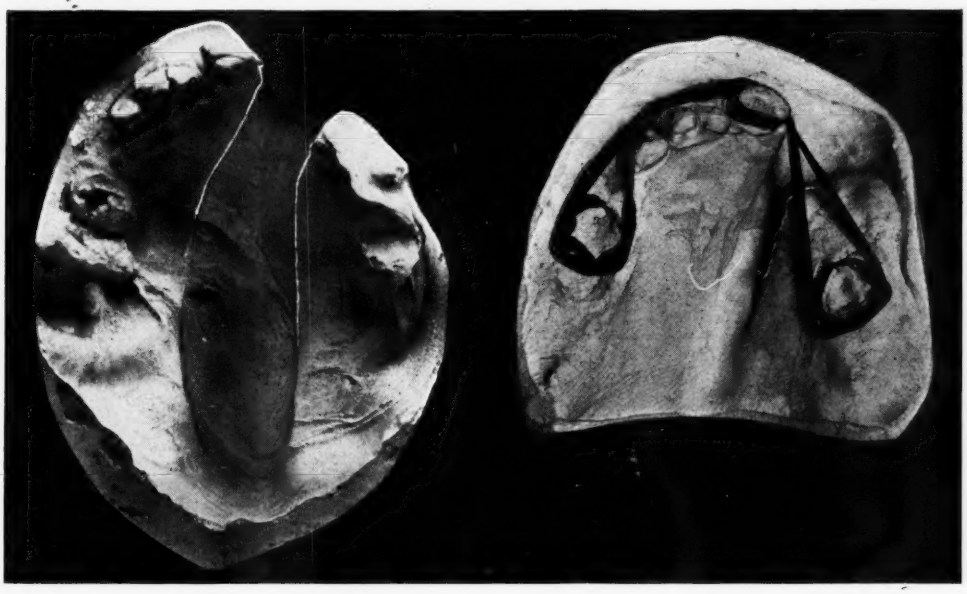


Fig. 16.—The upper two casts and the lower left one are of the palate of the same child taken at the ages of six, ten, and fifteen months, respectively. The lip was repaired over the open alveolar cleft, because at six months the child was too old for a Brophy. The fourth cast is of a child whose lip had been repaired over an open alveolar cleft at two weeks of age, yet, twenty-three months later, it will be seen there was a wide alveolar cleft.

process may remain open, one rarely sees wide maxillary clefts in children twelve years or older. This is why the older surgeons preferred to postpone the operation. The most desirable time to perform a "Brophy" is within the first two days of life, and it is not usually applicable after three months.

Narrowing of the cleft can be hastened at any time by closing the lip, but this

may require a year or more, and lip repair over an open alveolar cleft is not so apt to be satisfactory as over an intact arch. If the upper molars have erupted, the orthodontist can very materially hasten the closure, usually only two to three weeks being required (Figs. 17, 18, and 19).



*A.* *B.*

*C.*

Fig. 17.—The first cast shows a wide unrepaired cleft at the age of eighteen months. The cleft is partially filled by a transverse part of the nasal septum that would prevent the maxillary bones from being drawn together (see Fig. 7). At the first operation the part of the nasal septum was removed and the palate repaired by a von Langenbeck operation. As a result of the traction of the soft tissues across the bony cleft the palate became narrower, shown in Cast *B* made three months later, but there was still a wide alveolar separation. Dr. F. J. Brockman constructed the orthodontic appliance shown on Cast *B*, with which, by means of an elastic band, the alveolar cleft was closed in two weeks, as shown in Cast *C*. Then the lip repair was made.

Fracture of the alveolus with a chisel should not be done.

The speech training should be undertaken by a competent teacher as soon as the child is old enough to respond—three or five years, but a good teacher can usually help the speech at almost any age.

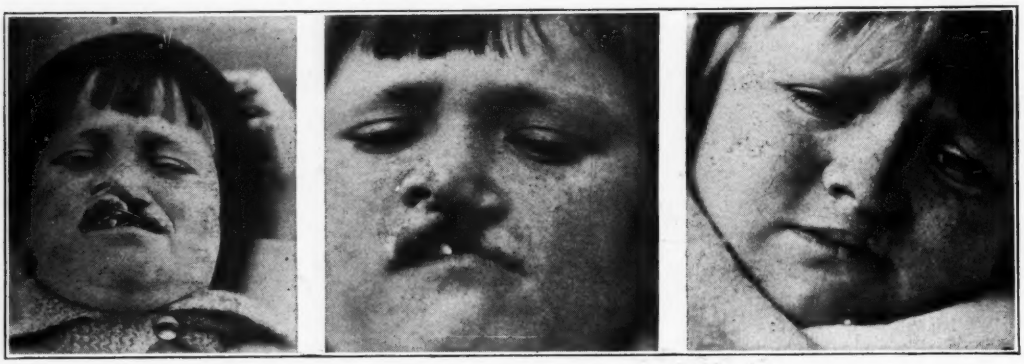


Fig. 18.—Obliteration of the alveolar cleft by the backward pressure of an expansive arch which here for want of an available tooth pressed against a piece of heavy lead plate, resting directly on the gum. Note that the ala that was tense in the first figure is relaxed in the second.

*A.*

*B.*

*C.*

Fig. 19.—Showing the reforming of the arch by an expansion arch and buckle. Note that the cleft itself has become slightly narrower.

# *ABSTRACT OF CURRENT LITERATURE*

**Covering Such Subjects as**

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

**The Mechanical Reconstruction and Restoration of Oral and Facial Deformities.** V. E. Mitchell. The Dental Outlook, 1919, vi, No. 10, p. 295.

Although the author has not been in service at the front his experience in private practice and in hospital clinics has given him a great deal of material for the study and working out of many problems. The principles involved in the treatment of these conditions are the same as in war injuries. The wonderful advancement in the treatment of jaw and facial injuries at the front is essentially due to the fact that the Government has become wise enough to add sufficient dental and oral surgeons to the army, with their special knowledge of handling these conditions.

When a portion of the jaw has been lost, either through necrosis or by surgical removal, the remaining fragments or parts are drawn toward each other by the contraction of the muscles, and the teeth are thrown out of occlusion, thus producing in many cases a great deformity. To prevent this it is necessary to keep the remaining portions of the jaw immobile and in proper alignment by a fixation of the teeth in their natural occlusion before the injury. The simplest method is to ligate the teeth of both jaws together with bronze wires. Angle's gold or German-silver fracture bands cemented to the teeth with loops or lugs upon the buccal surfaces, which are drawn together with wire ligatures, are also very satisfactory in some cases. The vast variety of conditions presented calls for a great deal of ingenuity and skill in devising appliances for this purpose, but the modern orthodontia appliances furnish a good beginning. Where it is possible to hold the fragments in place without ligating both jaws together, it is preferable for hygienic reasons as well as for the comfort of the patient. At the present time, the approved method of restoring the lost portion of the mandible is by means of bone-grafting, utilizing either a portion of the tibia or of a rib. By the dentist's cooperation with the surgeon, much can be accomplished in oral and facial deformities.

The most difficult oral defect to remedy is congenital cleft palate, and from his experience in this field, the author has come to the conclusion that much suffering is caused by the old antagonistic feeling between surgeon and dentist. A prosthetic restoration of deficient tissue will undoubtedly give better results than

surgical operations, in the many cases with a lack of tissue, which means that when operated upon, a shortening of the uvula and a stretching of the soft palate result, which does not improve the speech. Appliances of many shapes and different materials have been devised for the closure of the cleft, but with apparently little regard to the restoration of the nasal passages so as to permit normal respiration, or to the restoration of the resonance chambers, for the improvement of the voice and speech. All of these things have been taken into consideration in the appliances devised by the author, and an attempt has been made to restore all of the missing tissues and their functions. However, speech is not restored immediately, although the lost parts are restored to a nearly normal condition, and the accomplishment of satisfactory results with regard to speech will require sensible and persistent cooperation between dentist and patient.

**Gingivitis as a Cause of Pyorrhea. S. Danson. The Dental Outlook, 1919 vi, No. 10, p. 293.**

Gingivitis is the immediate predisposing cause of pyorrhea, and any injury of the gums may turn out to be more fatal than caries of the teeth, in view of the fact that gingivitis may pass into a chronic state without noticeable discomfort or warning of any kind. The gums and periodontal tissues require no less serious consideration on the part of the dentist than do the harder structures in the form of the teeth themselves. A distinct type of gingivitis is caused by the deposit of serumal calculus in the subgingival space, meaning a deposit under the free margin of the gum, or upon the pericementum after the peridental membrane is detached. The underlying causes for the deposition of serumal calculus are identical with those of salivary deposits. The first effect of serumal calculus in the subgingival space is to cause an irritation of the gingiva, the greatest danger of which is inflammation, and the subsequent detachment of the peridental membrane. Suppuration usually follows, beginning at the gingival margin and then spreading to the peridental membrane; the gingiva subsequently shrinks away and pockets are formed alongside of the root of the tooth. Thus pyorrhea becomes definitely established. Other causes of gingivitis are represented by malocclusion and traumatic occlusion of the teeth. The gums may also become inflamed by contact with the sharp edges of cavities and the imperfect margins of fillings. Similar irritations are caused by crowns which do not closely fit the root, or which infringe upon the attachment of the periodontal membrane at the gingival line. Lack of cleanliness of the mouth; errors in cleansing operations, and the misuse of tooth-picks, tooth brushes, rubber bands and silk floss, often lead to gingivitis. It is the dentist's duty to care as much for the preservation of the gingival tissues as for that of the harder tooth structures.

**The Value of Benzoic and Salicylic Acids. G. J. Bleecher. The Dental Digest, 1919, xxv, No. 9, p. 535.**

These two medicaments have been employed for the last few years by the author and have proved very beneficial in his hands in the treatment of infectious conditions about the oral cavity, and the treatment of pyorrhea, and also in the treatment of septic conditions of root canals, as well as a destroyer of bacterial life in cavities previous to filling teeth. The reason these two medicaments are

of value, is because they produce quick results, inasmuch as they require so short a time to produce devitalization of bacteria. Besides being powerful and quick in action, salicylic and benzoic acids have the advantage of not being escharotic. If employed as a mouth wash in a 1:100 dilution, either acid has no equal for the destruction of the pus-producing bacteria, if the rapidity of its action is taken into consideration. Benzoic and salicylic acids are very valuable for injection around pus-pockets in pyorrhea, by dissolving either in camphorated oil to the extent of one per cent and also employed in the same solvent, or in any essential oil, in the treatment of canals. It may also be combined with two per cent formalin or trikresol, and may also be added to alcohol in swabbing out canals or in cavities previous to filling. As a mouth wash, the author usually combines benzoic acid with thymol, to which he also adds menthol, some of the essential oils and glycerine.

**Advantages and Disadvantages of Reduced Silver in Dental Therapeutics. U. G. Rickert. The Journal of National Dental Association, 1919, vi, No. 10, p. 930.**

Summary: The possible advantages of reduced silver would suggest its use for prevention of caries, the protection of nearly exposed pulps, the possibility of filling certain tortuous canals, and preparation and treatment in root resection. As to the disadvantages, the instability of the solutions, the discolorations attending its use, and possible irritations are the most important. While these disadvantages are subject to control, they offer no encouragement in root-canal work to operators desiring a method infallible in careless operations. The fact that silver solutions properly reduced will sterilize, should not be depended upon to admit of less care than that required by other methods. Operators are cautioned not to be overconfident in the sterilizing properties of silver, and take too long chances. There is already evidence that this has too often been the case, and serious results are certain to follow.

The author's conclusions regarding the several silver treatments are based first, on some weil established therapeutic and bacteriologic principles; second, on clinical observation; third and last, laboratory experiment. The silver solution used for rapid reduction is made up as follows: Silver oxide is precipitated from a silver nitrate solution with potassium or sodium hydroxide. This is carefully washed to remove all impurities and kept moist in a small amber colored bottle. In this condition reduction is so slight that the author was enabled to keep it for a long time without much change. If a small amount is insoluble in excess of ammonia, there has been too much reduction and the silver oxide should be freshly prepared. This is the writer's stock solution and is more desirable than the ammoniacal solution made from silver nitrate, because it is free from nitric acid and other impurities.

**The Temple of the Tooth. Wide World Magazine, Oct. 1st, 1919, p. 84.**

This periodical brings an interesting illustration depicting the Temple of the Tooth, a gaily colored palace situated in Kandy, Ceylon, where a sacred tooth supposed to have belonged to Buddha is kept. An octagonal building near the temple is called the Pattripuwa. Both buildings are surrounded by a moat in

which are many turtles. Inside the temple Buddhist priests make an ear-splitting noise with tom-toms and other native music. Once a year a procession called the perahara leaves the temple with the sacred tooth said to be the tooth of Buddha, which is carried around the town on the back of a large elephant. A number of Kandyan chiefs in their splendid and quaint costumes, accompanied by more than one hundred elephants and much native music and dancing, take part in the picturesque procession.

**Epithelial Debris Located in the Peridental Membrane and Other Structures. E. S. Talbot. The Dental Cosmos, 1919, lxi, No. 10, p. 929.**

The true nature of certain epithelial cells found in any part of the alveolar process in the embryonal tissue, outside of the follicular wall, before the bone begins to form, was first demonstrated by the author twenty years ago, on the basis of an extensive line of research upon sheep, and he was the first to give these bodies the name "epithelial débris." Occurring in the peridental membrane throughout the entire length of the root, these epithelial débris are usually more numerous at the cervical margin, but occasionally are found in greater number of cells at the apical end of the root, especially in sheep. With special reference to the origin of these bodies, they are developed from the enamel organ, the epithelial cells migrating in all directions into the sac wall, part of which finally becomes the peridental membrane. These cells are also caught in the development of the cementum, as shown in the author's recent research work upon humans, dogs, sheep, and monkeys, with material obtained at or soon after birth. The epithelial débris described by him are derived from the external epithelium inclosed within the follicular wall. The live cells of the external epithelial layer migrate into the inner fibrous tissue of the sac but do not pass through into the alveolar process. The fibres of the alveolar process now unite with those of the outer surface of the sac, which later becomes filled with calcium salts to form the alveolar process. The latter now encroaches upon the sac wall, which becomes the peridental membrane, holding the epithelial débris within its fibres.

This important serial contribution to the histo-pathology of the jaws and apical dental tissues is further enriched by a number of illustrations, under low and high magnifying power, which are essential to the understanding of the author's line of argument and should be consulted in the original article.

**Supplementing Radiography with Blood-Tests. The Compendium. Oral Health, 1919, ix, No. 9, p. 342.**

Although radiography has done much to improve dentistry, it has its limitations, and too hopeful a view may be taken in regard to the outcome of dental treatment in difficult or obscure cases, when the prognosis is based entirely upon the radiographic findings. In the interest of the patient as well as the dentist himself, it is necessary to look for more information than can possibly be given by dental radiographs. A blood-test, together with a full radiographic dental series including the sinuses, seems to be imperative if a dentist is to undertake the successful treatment of the various ailments which come under his care. As a matter of fact, it becomes his duty to find out if such an examination has al-

ready been made by the physician, and the need for cooperation between the two professions thus finds another illustration. It is indeed futile for any dentist to promise a cure for systemic ailments, unless he has found out the nature of the infection and assured himself that the treatment comes within the range of dentistry. The radiographic disclosures are limited to the showing of rarefied areas of bone, canals improperly filled, pyorrhea pockets, large areas of necrosis, cystic formations, and so forth. In the presence of obscure systemic conditions, for which many a patient is now referred to the dentist, it is hardly reasonable to expect the whole situation to be immediately clarified by dental x-ray examination alone.

**An Effort to Discredit the Fifty Cent Radiograph.** H. R. Raper. Oral Hygiene, 1919, ix, No. 10, p. 1230.

In this most timely and opportune article, the author graphically describes the evils of cheap radiodontic work. He feels that he can do the greatest amount of good to the public, to the profession of dentistry and the new specialty of Radiodontia if he can put the fifty cent radiograph where it belongs and make it stay there with the two dollar and fifty cent crown, the five dollar set of teeth, the thirty cent amalgam filling and the bottle of patent medicine. The cheap dental x-ray photographer can make ten or more negatives, while the conscientious radiodontist is making a diagnosis of a single intra-oral x-ray negative area. The service of the radiodontist is to (1) obtain necessary data; (2) make faradic electric tests and such other tests as may be indicated; (3) make radiographs and make them over as many times as expediency may demand; (4) give a report to dentist or physician or both and give such advice, suggestions, prognosis, consultation and assistance as may help the patient, or those who are treating the patient. But the service of the dental x-ray photographer is simply to produce negatives in large numbers, and blame the x-rays i.e., the radiographs, when they fail to show what would have been shown if the radiographs had been made at the right angle to get a good diagnostic negative instead of at the lazy man's sure-shot angle. (The author here refers to the high-above angle for the upper teeth and the diagonal angle for the lowers; about 65° from the horizontal for the upper teeth; 40° for the lower). The fifty cent radiograph is, in brief, a money-making scheme. A fair price for a radiograph affords the opportunity to give good service, while the fee of fifty cents destroys such an opportunity. The necessity for quantity production of cheap radiographs is indicated by the fact that the cheapest laboratories flourish in the largest cities. Good radiodontic work is threatened with extermination by the low fee process.

**Exodontia in General Practice.** A. Wald. The Dental Digest, 1919, xxv, No. 9, p. 517.

Strict surgical asepsis should be the key-note to every oral operation. Tooth extraction is important and serious. The most prevalent complications after extraction are after-pains and hemorrhage. Pain after extraction is due to several causes, some avoidable, others unavoidable to some extent. A frequent cause of after-pain is a sequestrum or bit of fractured process left in the socket. This can

be avoided by proper inspection of the wound after extraction. If, however, it has been overlooked and the wound partly healed the parts should be opened and the sequestrum removed. The wound is then thoroughly irrigated with warm normal salt solution and patient discharged and instructed to return for inspection. In all painful conditions of the sockets, orthoform powder or iodoform gauze will relieve the pain in most instances. Undue spreading of the alveolus is a frequent cause of pain and can be avoided by compressing and reducing the distention immediately after extracting. If, however, this has been neglected at the time of operation, it will be a rather painful procedure, preferably to be done under an anesthetic. Foreign bodies such as particles of filling material are sometimes the cause of pain. They are often difficult to locate and require the aid of x-ray, for they may be lodged deep in the socket and escape discovery by eye or probe. Fractured bits of enamel of the extracted tooth or fragments of the root may also be the cause of disturbance. An acute undischarged alveolar abscess will cause pain, but the symptoms are entirely different from the usual socket disturbances and can be readily diagnosed. When any suspicion of pus exists, without proper drainage having been obtained at the operation, the wound should be lightly packed with iodoform gauze and kept under observation until all danger has passed.

Home treatment after extraction is important. The patient should be warned not to touch the wound with his fingers or any other object. A mouth wash is prescribed and the patient instructed to use it frequently. Every case should be inspected after 24 hours; if at that time the conditions of the wound are not satisfactory, proper treatment should be immediately begun.

**Cancer of the Mouth.** F. Bryant. Boston Medical and Surgical Journal, 1919, clxxxi, No. 15, p. 452.

The family dentist should be constantly on the lookout for mouth conditions which may be acting as a present or future cause for general disease. In relative frequency, as a favorable haunt of malignant disease, the mouth ranks fourth, being surpassed by the female breast, uterus, and the gastrointestinal tract. In man, the mouth is six times more susceptible. Although the exact cause of cancer is not known, chronic irritation in some form is held responsible for an important share in its etiology, a theory which is well borne out by mouth malignancy for besides harboring a multitude of germs, the human mouth abounds in exceptional sources of chronic irritation. Neglect of the teeth gives scope to irritative influences which in turn may lead to oral cancer, imposing upon the family dentist the duty to protect his patient against chronic irritative influences. "Viewed in this light, the dentist becomes the master-man in the great struggle to combat oral malignancy." Physicians and dentists should combine their knowledge and experience in the good cause of early removal of chronic irritative influences and the early detection of precancerous symptoms in the mouth.

The method of treatment which in the author's opinion gives the best results and the best promise for the future, is a combination of the cautery or electrocoagulation, radium, the roentgen ray, and surgery. The most dependable of this group, in his experience, the one he always uses in every case, and frequently alone, with great satisfaction, is the massively tremendous dosage of roentgen

rays. In combined radium and roentgen ray treatment, he makes use externally of the most massive roentgen ray cross-fire dosage that can possibly be produced, sparing neither tube nor machine in delivering the deepest penetration possible, without a single outward result after three years' experience. This use of radiation is now regarded by him, on the basis of extensive practical experience, as one of decided potentiality.

**The Maxillo-facial Surgeon in a Mobile Hospital. Rea P. McGee. Journal American Medical Association, 1919, lxxiii, No. 15, p. 1114.**

Only a few points of this comprehensive contribution can be selected for consideration in the limited scope of an abstract. The author was detailed as maxillo-facial surgeon to U. S. Mobile Hospital, No. 1, A. E. F., which was always in the area between the 75's and the six inch guns, and which received only the most desperately wounded men. Bone injuries in the maxillary region were most severe when caused by high explosive. Union in fractures of the maxilla usually occurs much more promptly than union of the mandible; but when a prompt result is not obtained, it is much more difficult to treat an ununited fracture of the maxilla. Abscessed teeth or teeth that were actually loosened in the line of fracture were always removed. Every fractured jaw must be drained at the point of the fracture. Drainage must be carried to the extreme. The great points to be observed in the front line work are the conservation of bone, mucous membrane and skin. All bone fragments that have live periosteum must be retained. Fractures of the jaw in war surgery are almost always complicated by wounds of the face. The jaw should first be splinted, or at least, temporary splint wire should be placed and followed by repair of the facial wound. All live tissues and all bruised tissues that have a sufficient vitality to recover must be preserved, and the rich blood supply of the face makes it possible for many bruised areas to regain their circulation. Actual loss of tissue sufficient to require flap transfer is comparatively rare. Wounds of the tongue were numerous. Bone fragments, teeth and bullets were commonly driven into and sometimes through the tongue. These injuries are not difficult to repair with proper instruments, and in no case was there failure of union. In this connection, the author's statement is interesting and suggestive that although the equipment furnished by the government for the first line work in this department of maxillo-facial surgery was well planned, the insurmountable difficulties in procuring specially designed instruments at the beginning of the war defeated the fulfillment of the plans. The only possible remedy was adopted by the author when he took his own equipment, a plan recommended by him as the only satisfactory solution for all specialists in any war or in any army.

**Benefits Derived from Combined Meetings of Physicians and Dentists. J. K. Eyler, Pennsylvania Medical Journal, 1919, xxiii, No. 1, p. 24.**

In the interest of public health, a closer association and advisory relationship of physicians and dentists is advocated by the author, who appreciates the benefit dentists would derive from the papers on various subjects read at the meetings. No doubt the affiliation would be a stimulus to both the medical and dental as-

sociations for higher efficiency and result in greater good to the public in general. The recognition of the mouth as a focus of infection has brought about the awakening of the medical profession to the relation of the condition of the teeth to health. The medical and dental professions can not be too closely related to each other in the diagnosing of disease and the treatment thereof, and with the advantage of the roentgen ray machine and the latest dental technic, it is up to the two professions to cooperate more closely in the treatment of disease, and urge, what every man or woman should know, and children be taught that "good health and good teeth are dependent one on the other." It has long been pointed out by the seers of dentistry that, since many systemic affections may have definite origin within the oral cavity, in the future the foundation of a true dental profession must rest on the same foundation as medicine, and not so much on handicraft and mechanics.

**Relation of Teeth, Tonsils, and Intestinal Toxemias to Diseases of the Eye. G. H. Bell. Journal American Medical Association, 1919, lxviii, No. 15, p. 1127.**

The importance of focal infections encountered in the practice of ophthalmology, more particularly the teeth, tonsils, and toxemia of the intestinal tract, is emphasized by the author on the basis of extensive personal experience in the Eye Department of the New York Eye and Ear Infirmary. With special reference to dental infections as a cause of eye disease, too much stress can not be laid on a thorough examination of the teeth, which includes: (1) An inspection of the mouth; (2) palpation of the gums; and (3) roentgenograms of all the teeth, dead or alive, pivots, arches, and bridges. Any part of the eye may be attacked as a result of dental infections, but by far the greatest number of cases show the iris, ciliary body, choroid or cornea to be affected. In operations on the eyeball, when pyorrhea alveolaris is present, or when he suspects any trouble with the teeth, the author always begins by referring the patients to an up-to-date dentist, who at once starts his treatment. When the dentist has finished with the patient, from four to six weeks are generally allowed to pass before operating, with the object of eliminating all toxins from the system. It is an admitted fact that toxemia may result from chemical changes in the intestinal contents, that absorption of protein toxins from the intestinal tract takes place, and that the blood stream is the carrier of the infection, the three common foci being the teeth, tonsils and the intestinal tract. Modern dentistry is relieving the world of much misery, by the watchful care of the foci connected with the teeth, and the time is not far distant when modern dentistry will be made a department of medicine. While many of the results of oral infection are apparent to the eye, the deep-seated and hidden foci, which are frequently the most virulent, are entirely hidden and can only be revealed by the roentgenogram. Decayed teeth afford a ready passage into the system for disease germs, and patients must be educated to look after their teeth and tonsils as well as their diet.

**The Importance of Oral Hygiene.** F. Gonzalez. Revista Dental, Habana, 1919, xii, No. 9, p. 265.

The importance of oral hygiene may be considered from three viewpoints, the esthetic, the physiologic, and the infectious. Neglect in this respect inevitably leads to dental caries and loss of the teeth. Alveolar absorption involves the obliteration of the facial outlines and alters the expression of the countenance. The mouth is the entrance-point of the majority of the pathogenic and non pathogenic germs which infect the body and find in the mouth all conditions necessary for their survival, in the form of heat and moisture, nourishment, and a suitable reaction. The capacities of the mouth as an excellent breeding-place for these germs are greatly increased by deficient oral hygiene. The most harmful bacteria are represented such as the typhoid and tubercle bacillus, perhaps even the Neisser gonococcus, which is claimed to be identical with the diplococcus found in pyorrhea. These bacteria merely wait for the organism to become debilitated to exert their virulent activities, and this weakening may be due to the same deficient hygiene, for we know that certain septic dyspepsias originate in the buccal cavity and that many cases have been cured simply by the removal of an infected prosthetic apparatus. The circulatory and renal systems, the liver, the intestines, etc., are often weakened or slightly diseased, but recover spontaneously under favorable conditions; on the other hand, when the mouth is not in a hygienic state, the organism is weakened, with the result that these affections are aggravated and may become chronic. This constitutes an important factor of oral hygiene as related to the health of the individual, for the remote cause in these cases is undoubtedly the lack of this hygienic care. The Mayo brothers have shown that some cases of peritonitis are referable to the lack of oral hygiene, and they operate upon no case of appendicitis without first securing thoroughly hygienic conditions in the patient's mouth. In addition, the neglect of oral hygiene is followed by dental caries, gingivitis, and stomatitis, as a result, the food is imperfectly prepared in the mouth and more work is thrown upon the stomach, while the inflammatory products and epithelial remnants which are swallowed, act as a poison for the general system.

The science of dentistry has made rapid progress, and the dentist has come to occupy the position in medicine to which he is entitled as shown by the establishment of a Municipal Dental Service in all large cities of the civilized world, and by compulsory inspection of the teeth in the dental services of the schools in the United States. One of the requirements for entrance into the American Army is a satisfactory state of buccal hygiene. The author believes that in the course of years, by further progress along these lines, the race will be greatly improved and many of the affections which are now treated empirically will disappear, their etiologic origin having been traced to the mouth.

**Mandibular Bone Grafts. C. W. Waldron and E. F. Risdon. Royal Society of Medicine. Section on Surgery, 1919. Meeting of Jan. 22nd. Lancet, London, 1919, p. 181.**

The authors state that although bone transplantation is a surgical procedure of long standing, the unexampled opportunity afforded by war injuries has permitted a careful study of its limits and possibilities, especially in cases in which the mandible has been seriously broken up. They consider that the close and continuous cooperation of surgeon and dental surgeon is of prime importance in these cases. In early stages the mouth must be kept as clean as possible, special care being taken in regard to septic pockets and cavities, and in this stage dental splints should be used, the hindering sequestra being from time to time removed, for the prevention of displacement and to ensure due control of the edentulous posterior fragments. Dental splints are usually required for at least two months. In cases where nonunion is obvious, there should be early attempts at movements of the jaw for the purpose of avoiding atrophy and articular ankylosis. Careful periodic examination of the teeth and the extraction of such as need it is regarded as important. Teeth which are of service in the immobilization of the parts should be preserved, and there should not be any great pressure on the teeth. Drainage must persist so long as there are any unhealed sinuses. At least six months should elapse after the disappearance of sepsis and inflammation, before bone grafting operations are attempted; and when the ununited fragments are strong and easily controlled, so that the patient is able to masticate with the aid of splints, this period before operation can be extended. The authors believe that quite a number of failures have been attributable to operation having been done too early. Grafts should include both the periosteal and the endosteal surfaces; in fact, all the elements should be comprised, the graft will then most nearly approach the physiologic. When open cancellous bone, such as that of the rib, is used, replacement is rapid; it is less rapid in grafts cut from face or tibia. The relative osteogenetic activity of transplanted bone varies with the individual case. The author's work has been done with autogenous bone grafts. In most instances it is preferable to fix the fragments in good position by means of strong dental splints and carry out the operative procedure accordingly. The splints should be cemented to the teeth at least a week before the operation, to allow the buccal mucous membrane to become habituated to their presence. Every effort must be made to avoid perforation into the mouth cavity. The edge of the fragments should be trimmed back 2 cm. and intervening cicatricial tissue excised and discarded. After a good deal of experience the authors believe bone from the iliac crest gives the best results. The patient should be kept in bed a few days to prevent the formation of a hematoma, which might become infected. If a case requires closure of the mouth for months, it should be opened at intervals for inspection.

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# *EDITORIALS*

## Malocclusion and Pyorrhea

WE have often called attention to the fact that malocclusion is one of the most potent causes of pyorrhea that exists today. However, in making that statement we have always been accused of advocating the dangers of malocclusion and consequently trying to impress upon the public the seriousness of what might happen if malocclusion was not corrected, in order that we might further our own specialty. However, a paper by Dr. C. P. Wood of Detroit, Mich.,* who is not an orthodontist, contains a number of statements with which we so thoroughly agree and with which we believe many members of the dental profession are not exactly familiar that we can not allow it to pass without emphasizing the importance of the subject.

*Wood, C. P.: A Consideration of Induced Malocclusion as a Factor of Pyorrhea Alveolaris, Dental Items of Interest, xli, No. 9.

Almost any one who has practiced orthodontia for a number of years has probably been asked the question many times, as to what would be the ultimate result if the malocclusion was not treated. A great number of orthodontic patients seek our service, because the malocclusion is producing a facial deformity and they realize the treatment of the condition will improve the facial beauty. Nevertheless there remains a large number of untreated and troublesome malocclusions, which disturb the facial beauty very little, but which are the most serious conditions we are confronted with from a pathologic standpoint. We have long realized the seriousness of this type of malocclusion, and have often refrained from stating the seriousness of the condition because a great many people would be inclined to believe that we were painting the picture too black in order to influence them to have the malocclusion corrected. It is, therefore, with a great deal of satisfaction that we find statements made by a man in another specialty which confirm the opinion and knowledge which we have gained from the practice of orthodontia and which shows that "Malocclusion is responsible for more serious troubles with the masticating apparatus than all other causes put together; not the least of these is pyorrhea. Malocclusion is a great factor in the causation of pyorrhea." If we as orthodontists make these statements to our patients, they are inclined to believe that we are telling them too much, because, unfortunately, the average individual or parent is unable to carry a picture of dental conditions as they will be ten or fifteen years hence and realize the serious consequences that will develop. We have long contended that malocclusions were simply the result of forces of occlusion which have gone wrong, and we are pleased to note that Dr. Wood in his article lays particular stress upon two forces of occlusion as being factors in the production of malocclusion and pyorrhea. He calls attention to the abnormal action of the inclined planes of the incisors and canines, which result when the contact is broken by the extraction of molars and premolars. The destruction of the forces of occlusion by the extraction of a tooth which first destroys the proximal contact very soon results in the drifting of the remaining teeth, which eventually brings into play the abnormal forces of the inclined plane. This, of course, produces a traumatic occlusion, which periodontists recognized again as a cause of pyorrhea. However, it necessarily follows that traumatic occlusion is the result of some abnormal force of occlusion, whether it be produced from extraction or the improper correction of malocclusion as has been called to the attention of the profession.

We are aware of the fact that a great many malocclusions in children are going untreated, because the dentist fails to realize the condition that is going to develop as the result of that malocclusion fifteen or twenty years later. In a great many instances parents object to orthodontic treatment and the financial outlay, because they fail to realize the benefit the child will derive from it. The correction of the malocclusion from an esthetic standpoint is the smallest thing that we give our patients. A case of malocclusion when properly treated gives the individual a dental apparatus with which he is going to escape a large number of troublesome conditions later in life, which conditions are absolutely certain to develop, as stated by Dr. Wood, unless the malocclusion is corrected.

It is interesting to note that Dr. Wood has recognized the fact that the treatment of malocclusion is one great factor in the prevention of pyorrhea later in

life. He even consents to give the orthodontists credit for doing a certain amount of good for the patient, whereas, we have repeatedly seen papers by periodontists who have condemned orthodontic treatment, claiming the orthodontists were doing more harm than good. We will admit that the criticism holds true of some methods of treatment, but it does not prove that the science of orthodontia does not do a great amount of good if properly practiced and scientifically conducted. In regard to the question of malocclusion treated with improper appliances producing pathologic conditions, we must unfortunately admit that it is true, but we also desire that men do not lose sight of the fact that a great amount of good can be done by proper methods of treatment.

Another feature which Dr. Wood mentioned in his paper, is the harm produced by the promiscuous extraction of third molars, thereby allowing a second molar to drift distally and destroy the proximal contact between the second and first molars. There is probably no tooth in the mouth about which so many positive (?) statements have been made as have been in regard to third molars. We find men who seem to have an insane desire to extract every third molar they see regardless of its condition, and justify themselves by saying the third molar was not needed anyway. In a great many mouths the third molar becomes a useful tooth as explained by Dr. Wood, in completing the proximal contact of the arch and acting as a buttress for the second molar. We also know other cases where the third molar becomes a contributing factor to the production of malocclusion, and if allowed to remain in that sense may be said to be a contributing factor to pyorrhea as malocclusion is one of the greatest factors in the causation of pyorrhea. Consequently, we find as in a great many cases that no one rule can be applied to all individuals, and in one patient we would advise and insist upon the keeping of the third molar and in another patient we would recommend its extraction. This simply shows that men engaged in the practice of orthodontia or periodontia must have a much broader knowledge of anatomic and pathologic conditions than has been possessed by certain individuals in the past. We are opposed to radical statements along any line, for example, the individual who says, "all third molars should be extracted," or the equally mistaken judgment that "they should all be retained," for those questions can only be answered by knowledge of the forces of occlusion as we know them to exist today.

We wish to agree with Dr. Wood and compliment him upon his masterful presentation of the subject, and again make the statement we made before that there is a close relation existing between malocclusion and pyorrhea.

# *ORTHODONTIC NEWS AND NOTES*

The editors desire to make this department a permanent feature of the Journal, but in order to do so must have the full support of the orthodontic profession throughout the country. We would deem it a great favor if our subscribers and readers would send in such announcements as might be of interest to the profession.

## Alumni Society of Dewey School of Orthodontia

The next annual meeting of this society will be held on April 1, 2, and 3, 1920, at the Edgewater Beach Hotel in Chicago. The usual high standard of the meetings of this Society will be maintained. One-half day will be devoted to clinics. All interested in orthodontia are cordially invited to attend these meetings. Address all communications to the Secretary, Dr. George F. Burke, at 741-43 David Whitney Building, Detroit, Michigan.

## Pacific Coast Society of Orthodontists

The Pacific Coast Society will hold its next annual meeting on the 17th, 18th, and 19th of February, 1920, at the Palace Hotel, San Francisco, California. Doctor J. Mershon, of Philadelphia, will give a course in technic. Dr. John R. McCoy, of Los Angeles, is President of the Society. Address all communications to Dr. Carl O. Engstrom, 306 Hagelstein Building, Sacramento, California, who is secretary and treasurer of the society.

## Notes of Interest

Dr. P. T. Meaney announces the opening of his offices at 301 and 302 Stevens Building, Portland, Oregon, for the exclusive practice of orthodontia.

Dr. Paul J. McKenna is now located at 69 Chestnut St., Springfield, Mass., where he will succeed Dr. A. LeRoy Johnson in the practice of orthodontia.

Dr. Lowrie James Porter announces the removal of his office from Grand Rapids, Michigan, to the Professional Building, 17 East 38th St., New York City, for the practice of orthodontia.

Dr. Harry L. Hosmer has returned from France and has opened his office in the Shurley Building, 32 Adams Avenue, West, Detroit, Michigan, for the exclusive practice of orthodontia.

Dr. Norris Clayton Leonard announces the removal of his office from Nashville, Tennessee, to 1113 N. Charles St., Baltimore, Maryland, for the exclusive practice of orthodontia.

Dr. Oscar M. Schloss announces the removal of his office to 39 East 61st Street, New York City. Dr. Schloss was formerly located at 140 West 58th Street.